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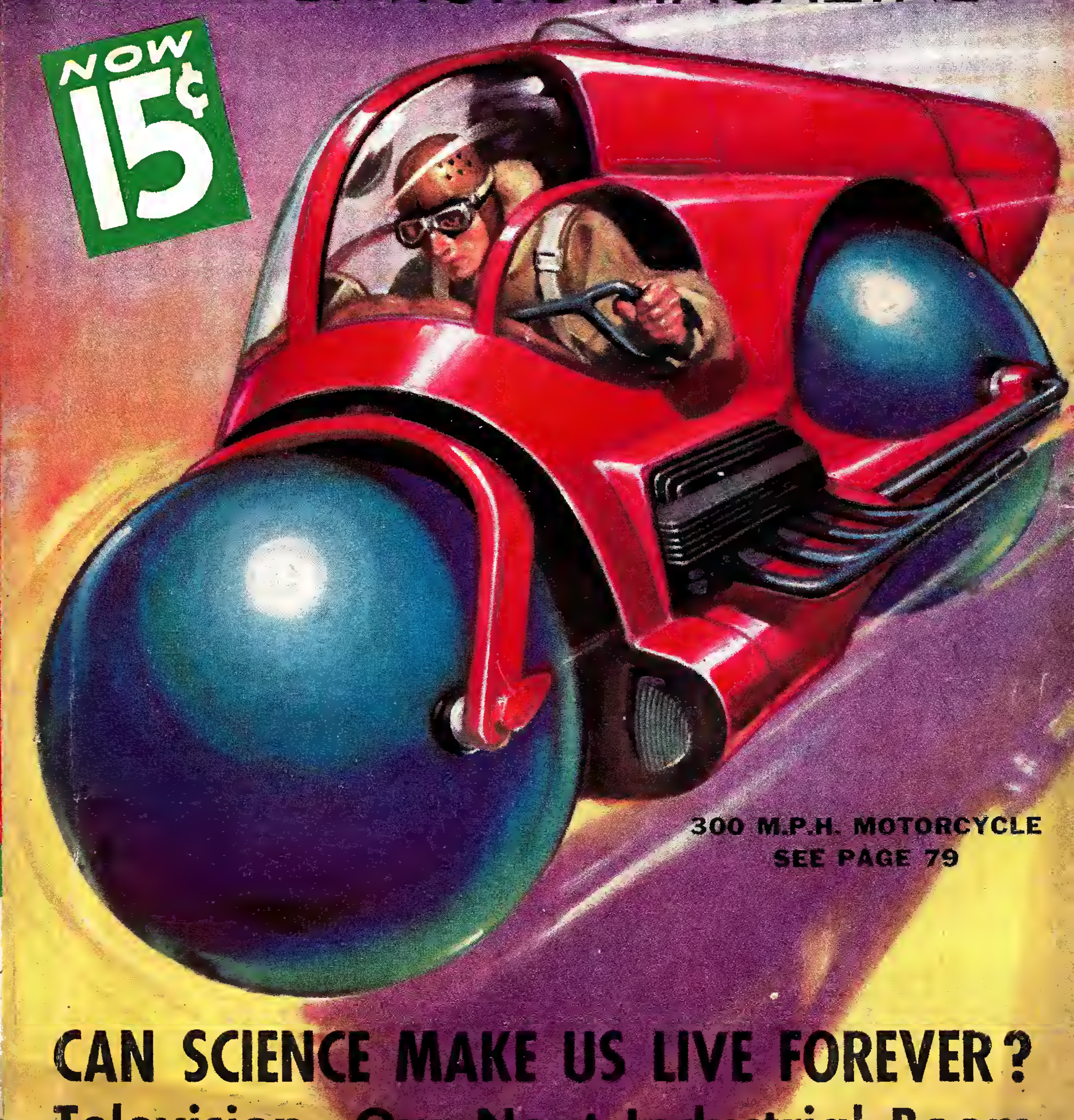

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CAN SCIENCE MAKE US LIVE FOREVER?

Television—Our Next Industrial Boom

JUNE 1936
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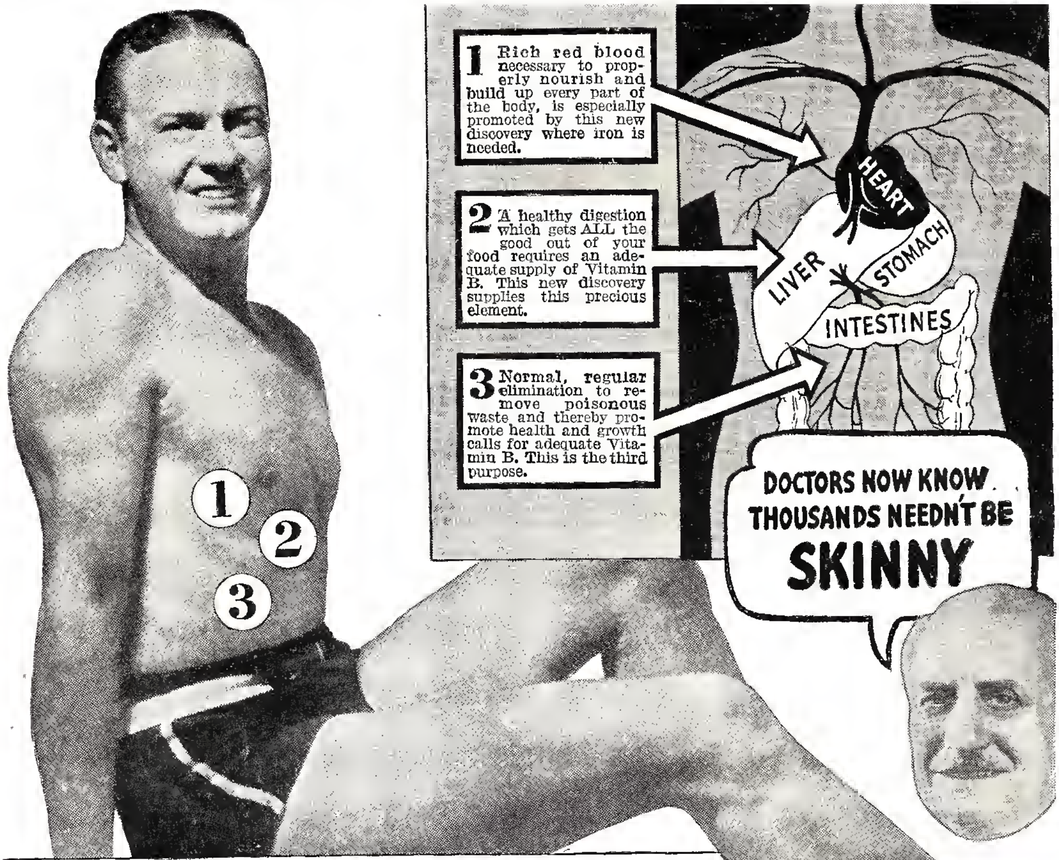

1 Rich red blood necessary to properly nourish and build up every part of the body, is especially promoted by this new discovery where iron is needed.

2 A healthy digestion which gets ALL the good out of your food requires an adequate supply of Vitamin B. This new discovery supplies this precious element.

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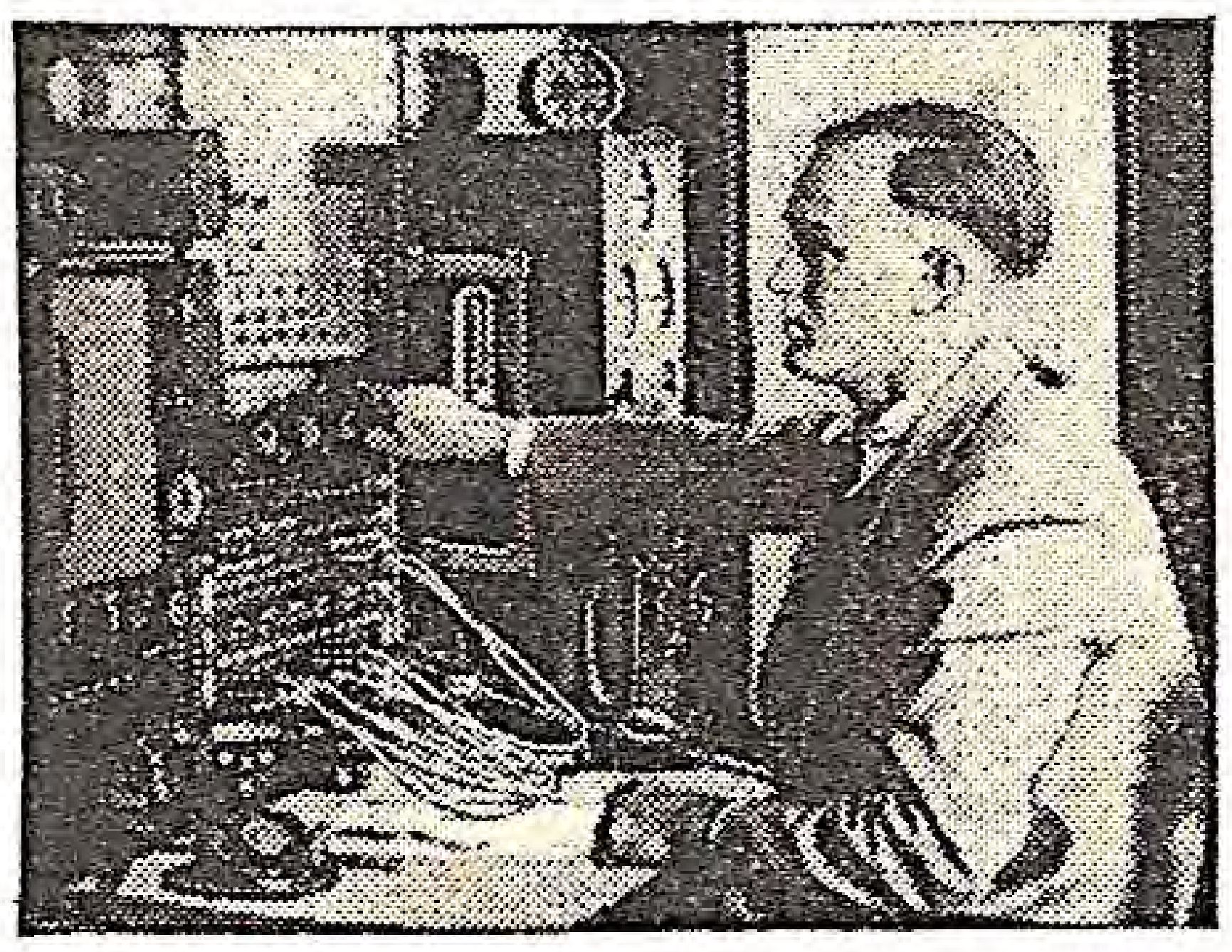

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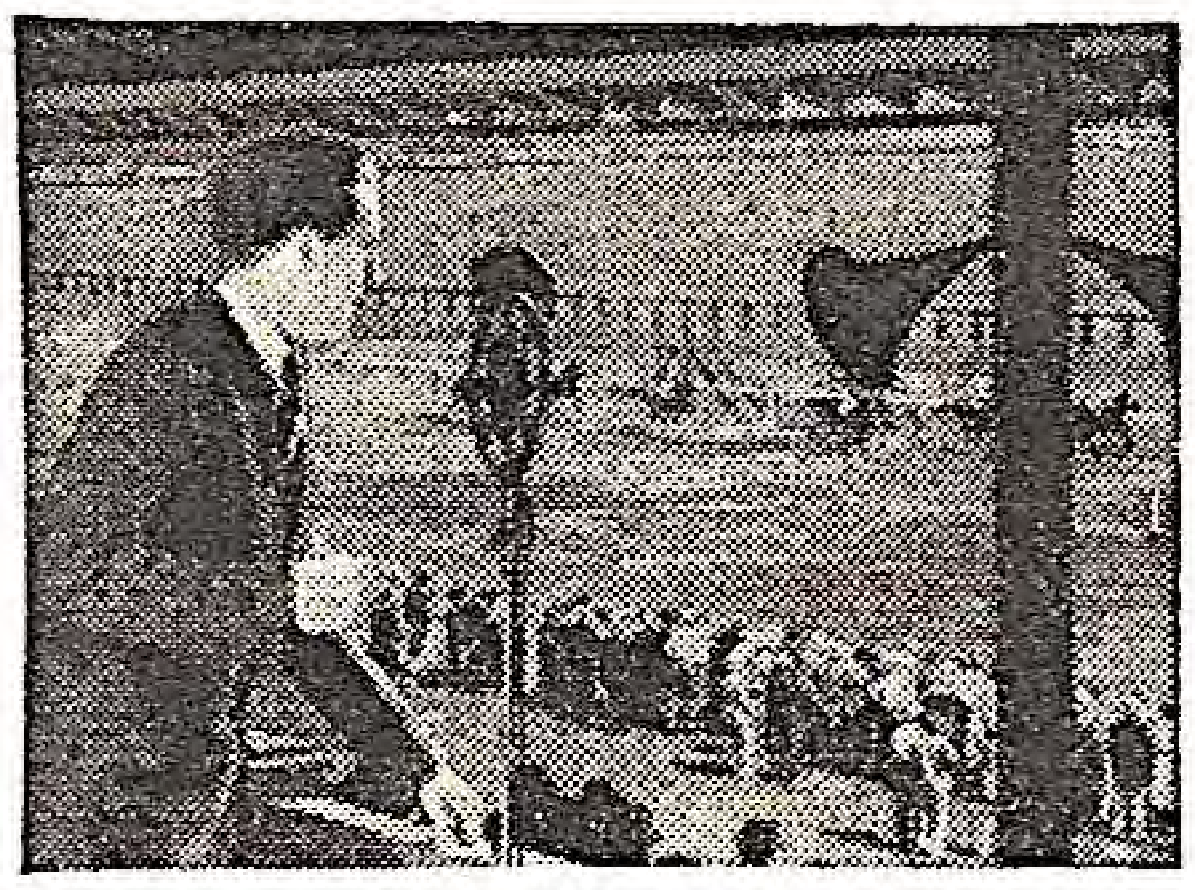
Set servicing pays many N. R. I. men $200 to $1,000 a year for their spare time. Full time men make as much as $30, $50, $75 a week.



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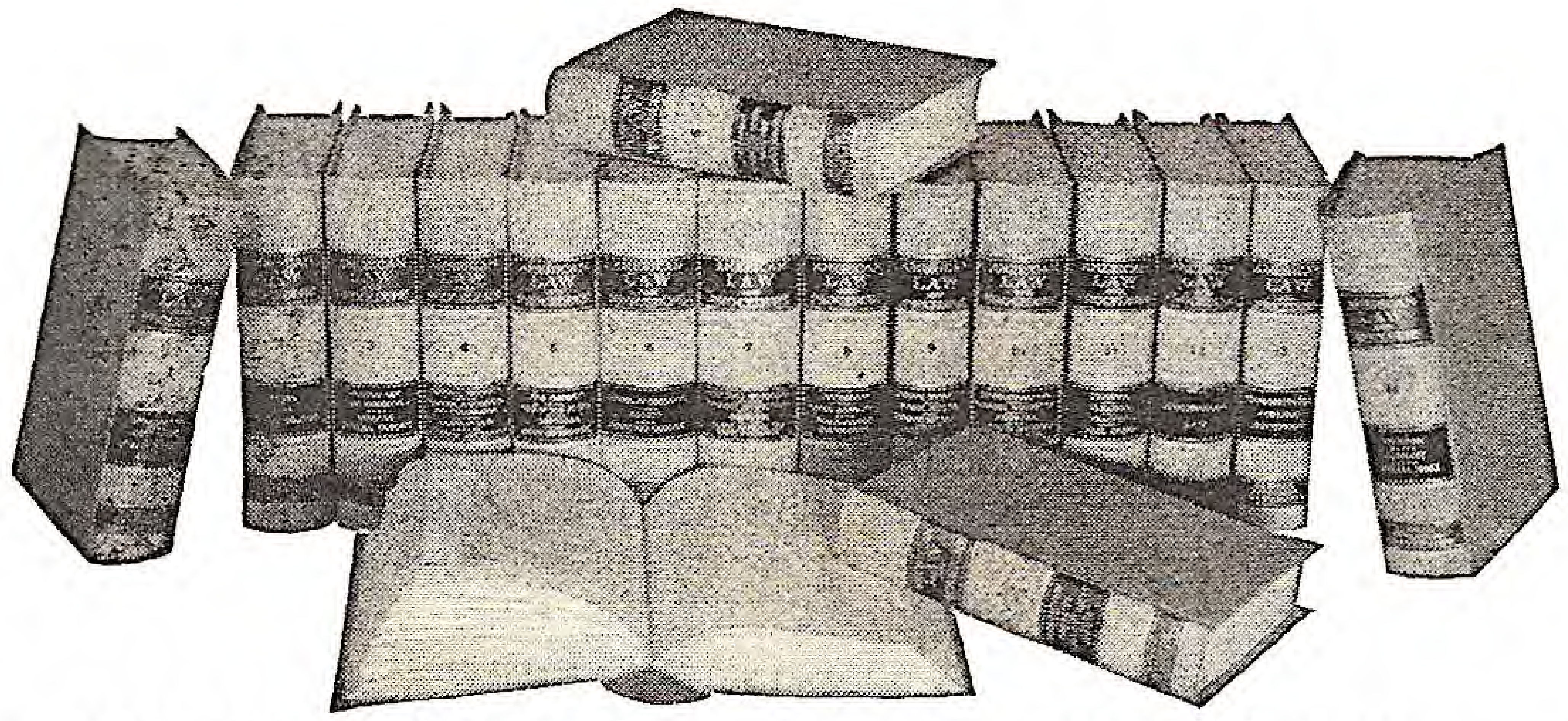

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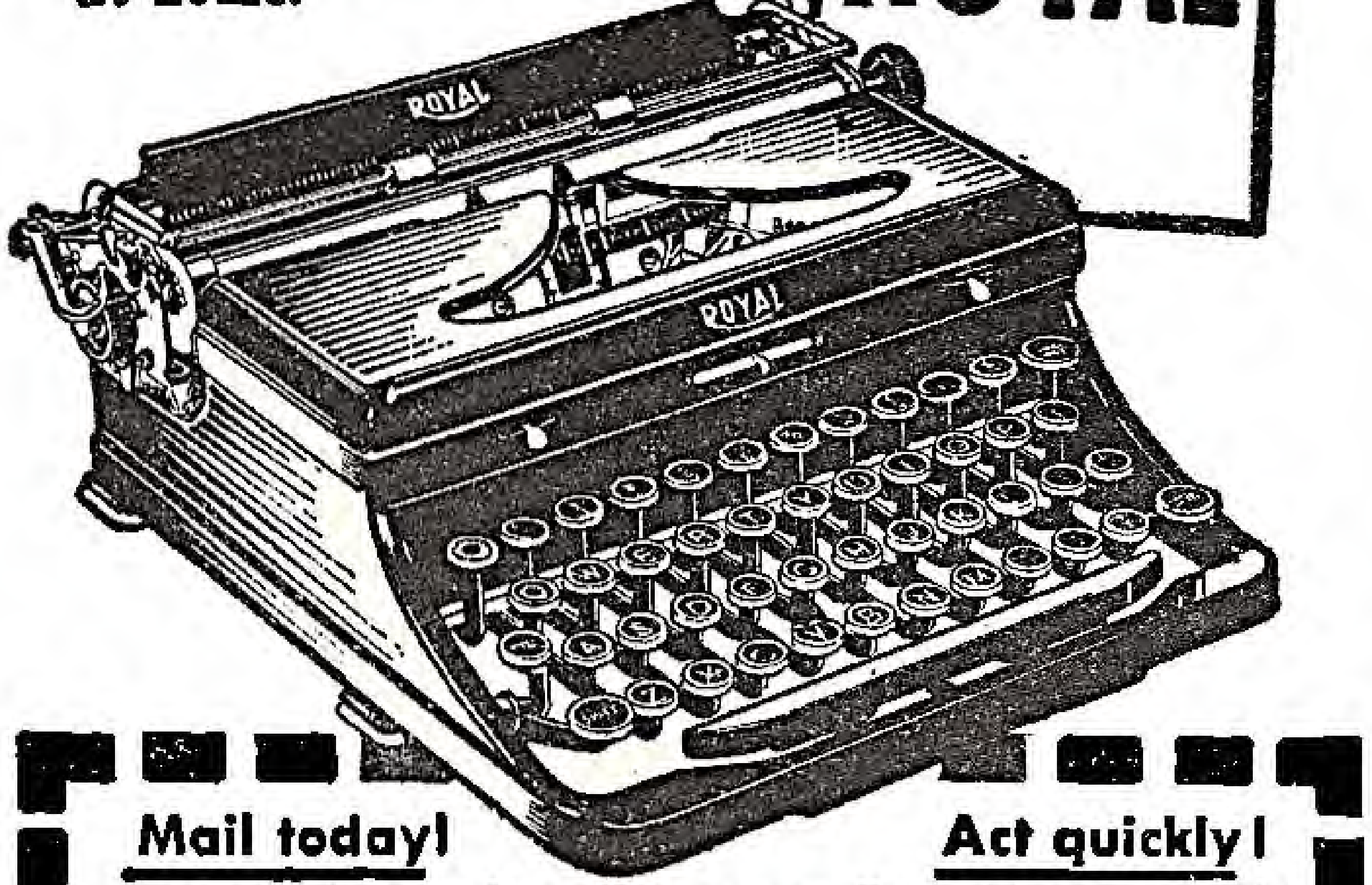

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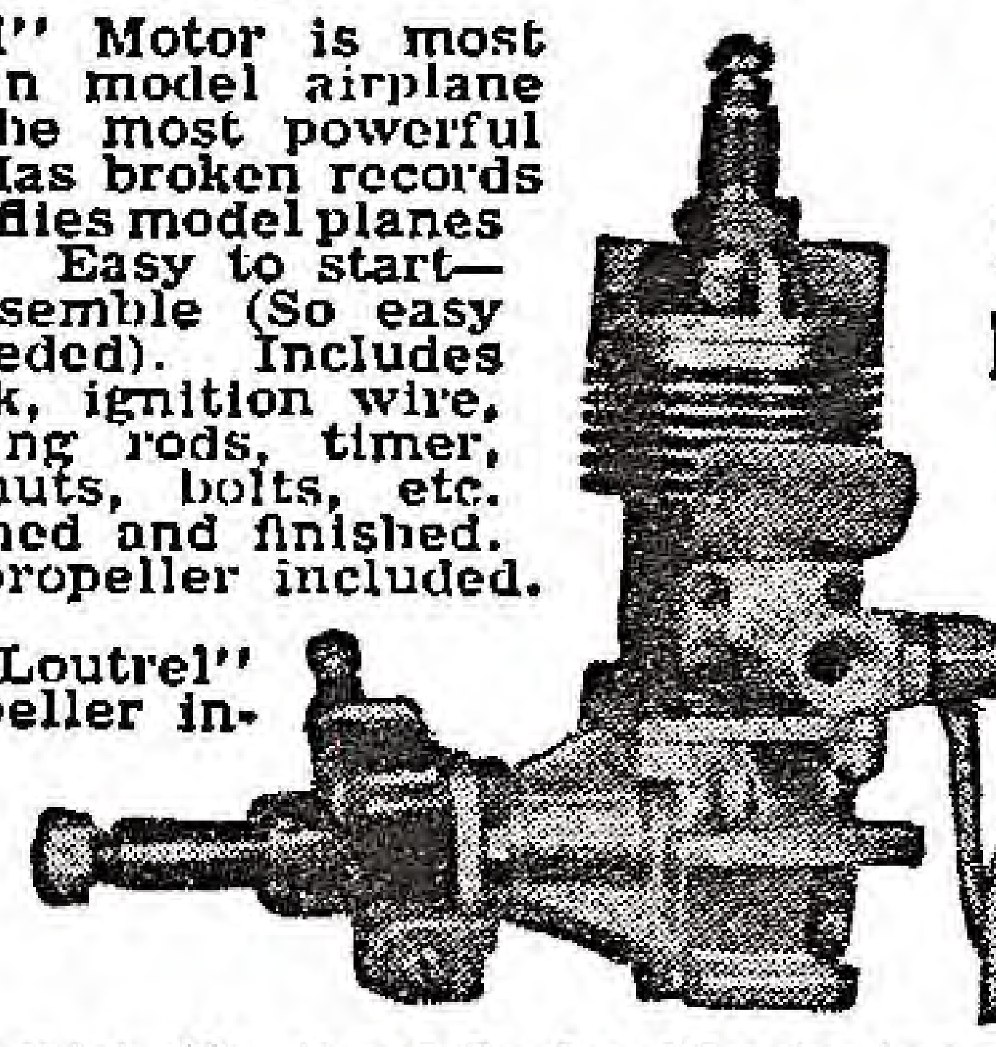

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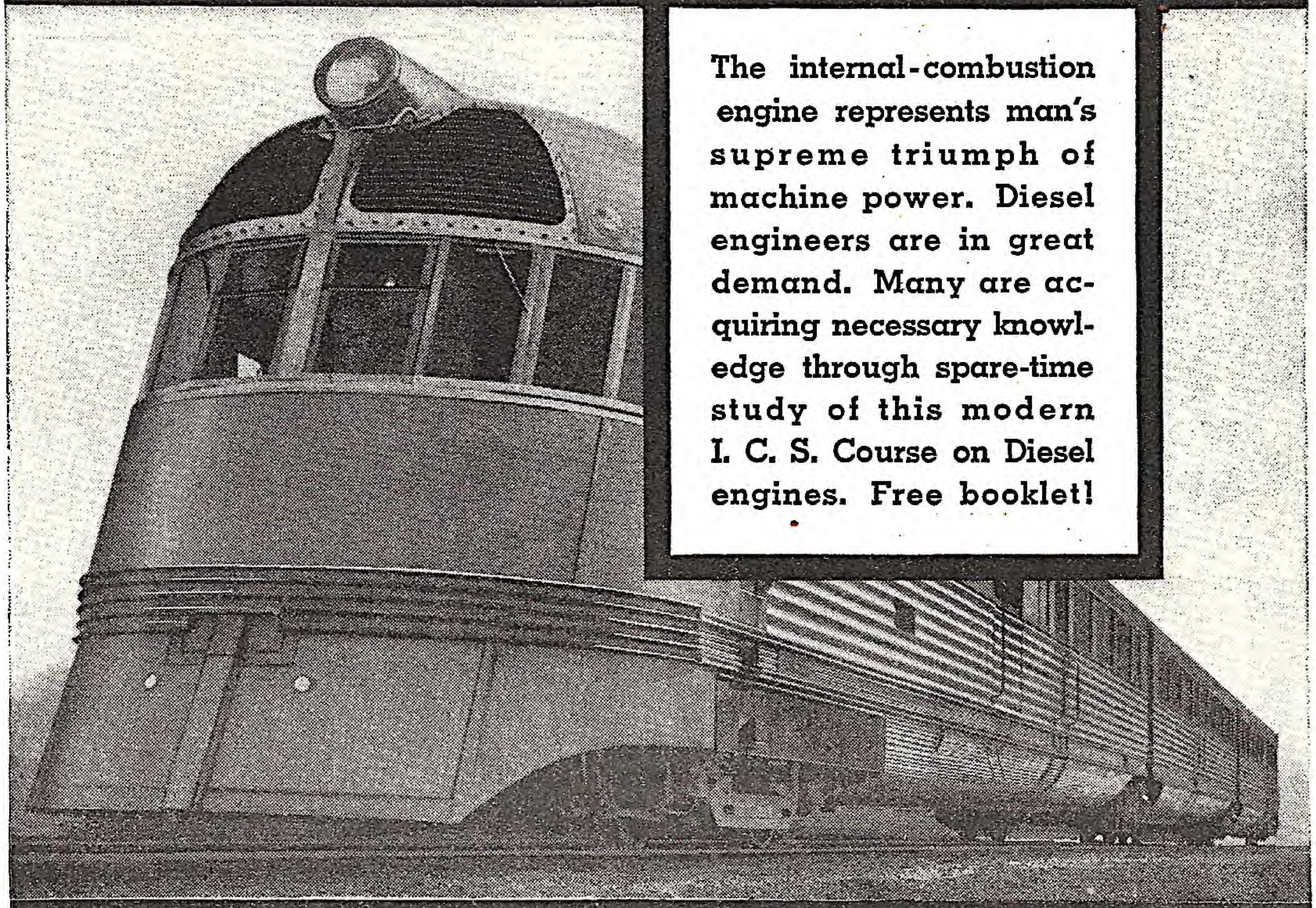

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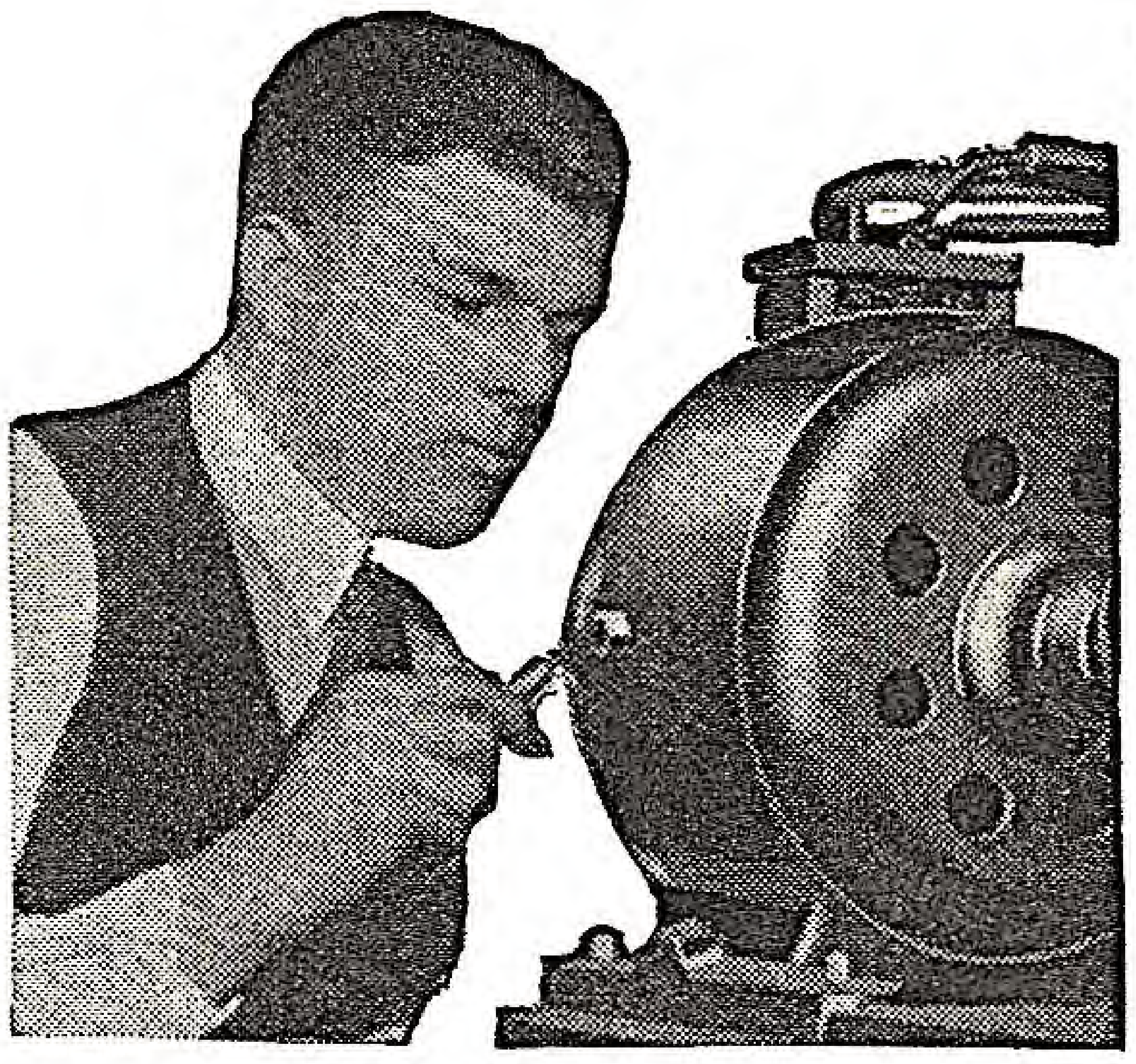

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Here is YOUR life opportunity. Every day brings news of new developments in this fascinating, big-pay field, with more jobs and a greater future for the trained man than ever before. If you are ambitious to get ahead, I want to help you. MAIL THE COUPON BELOW and **I'll tell you about my finance plan, which has enabled thousands to get Coyne Training with very little money.** Get training **first,** than take **18 months** to complete small monthly tuition payments starting FIVE MONTHS after you begin your training, or 2 months after your required 12-weeks training period is over. **This is not a correspondence course.**

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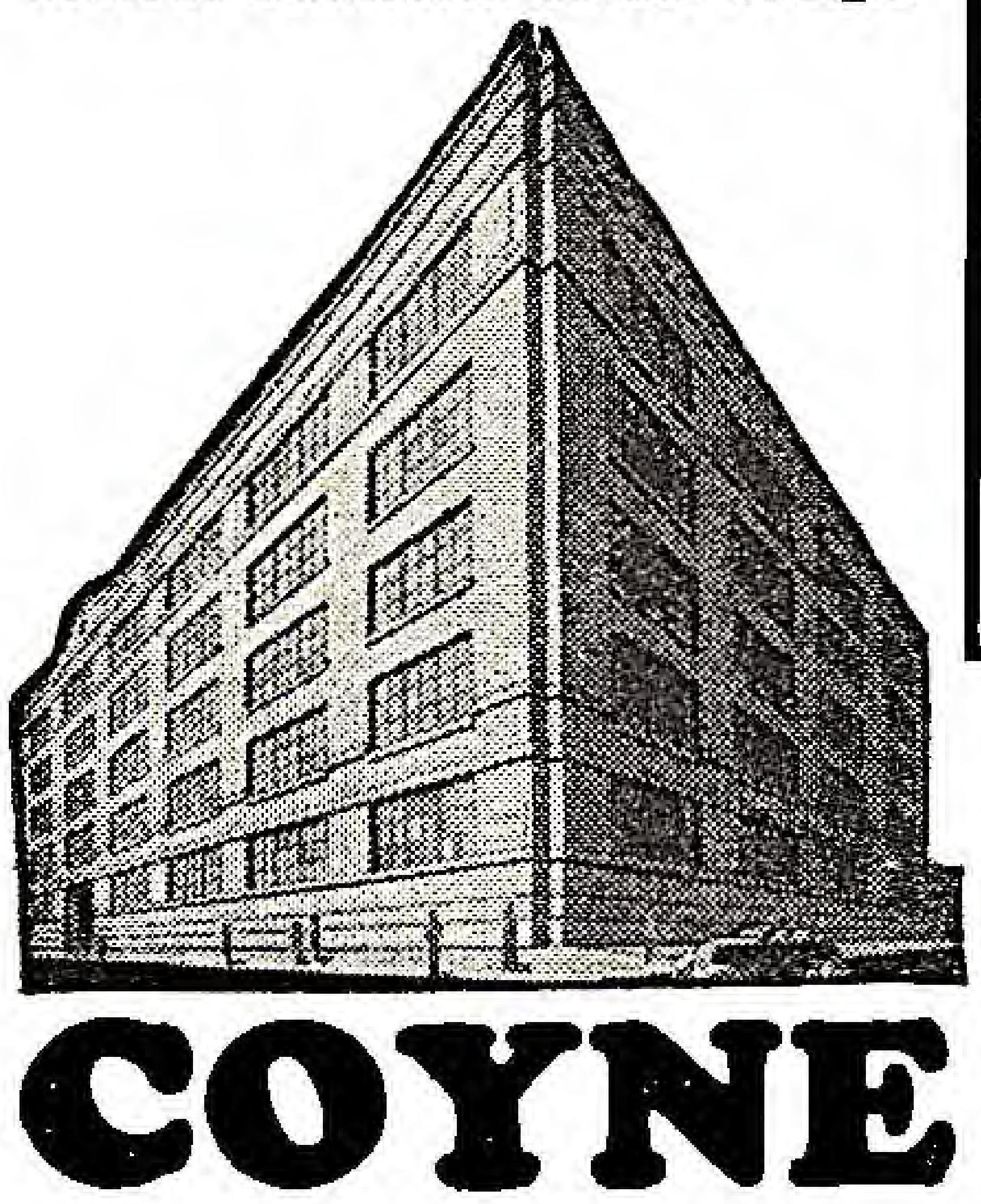
If you need part-time work to help pay living expenses while at school, tell us your problems and we may be able to help you as we have hundreds of other students. Then, after you graduate, our Free Employment Department will give you life-time employment service. Every Coyne graduate also receives a Life Scholarship, with free technical and business service and privilege of review at any time without additional tuition charge.



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A frank man to PATENTS-INVENTIONS

THE world of invention moves on. The Patent Office clerk who resigned his job back in 1833, because he said there was nothing left to invent, now stands out as one of the funniest men in American History. Think of everything that's happened in the last 100 years! Did you see the notice in the papers that an obscure worker, Hans Wach, has invented a simple device to utilize exhaust steam on steam boats? *Already, the report states, the steam ship lines have saved more than $15,000,000 in fuel bills with his invention.* Almost in the same breath the Dept. of Commerce announced that it will soon test out a new, non-crashable aeroplane, which the average man can learn to fly in a day, which will travel at 110 miles an hour and sell at the price of a cheap automobile. An unknown Seattle man has invented a robot to go 5,000 feet under the sea and recover millions and millions of dollars worth of gold lying at the bottom of the ocean since the days of the early Spaniards.

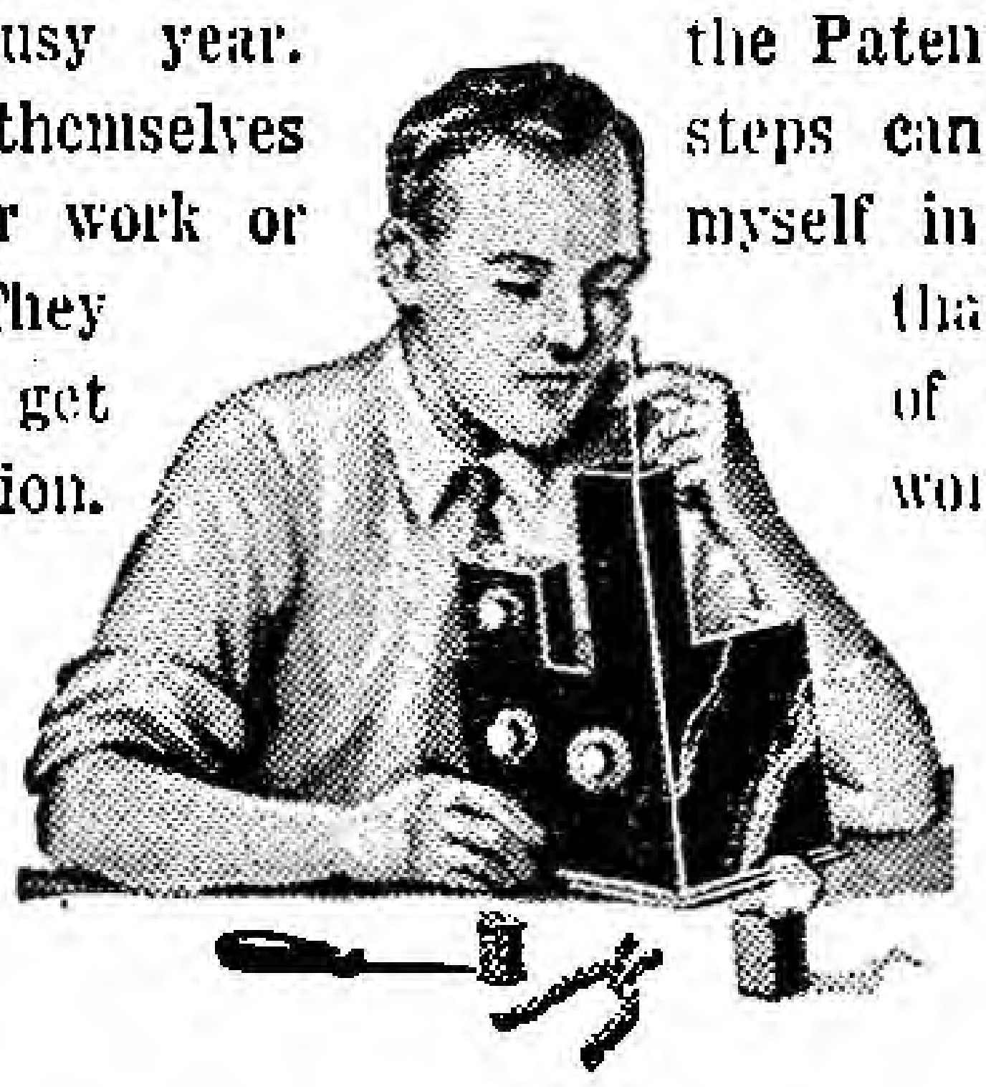
Remember this: For every outstanding big invention there are thousands of small, simple things for use in the home, the office, the factory, on the farm, on every sort of travel conveyance. Little articles like you find on the counters of a 10-cent store, hardware store, drug store, toy and novelty shop.

Many Little Ideas Have Big Commercial Possibilities

A person finds something he's using doesn't work right, or it's clumsy, or costs too much. He gets a happy thought. He improves the old Article. That's contribution to human progress. That's the way that many, many men have reached the goal of financial comfort, independence and even wealth. Most of the things millions of us use didn't come from the brains of engineers and physicists. They came from the mind and maybe the crude home work bench of Mr. Average Man, busily engaged in earning his bread and butter at whatever chance or circumstance has given him to do. The "little" man's opportunity as an inventor was never greater than it is today.

Who Are Inventors?

You'd be amazed at the men we contact in the course of a busy year. Most of them do not consider themselves inventors at all. During their work or leisure they get an idea. They work it out on paper. They get in touch with us about Protection. Did you know that a dentist invented the stock ticker, a school teacher the telephone, a farmer the typewriter, an artist the telegraph? Did you know that the crinkly hair pin—sold by millions now—came about because a husband saw his wife twisting the old-fashioned straight hair pin to make it stay in place? **Poor men who have no thought of invention now will be financially well-fixed in a few years because of a happy thought that the world could use to advantage.**



Can You Answer These Questions?

Ask yourself these questions: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the *first* man to think of *my invention*? Is a Patent worth the cost? Do I need a model? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been patented? These are but a few of the questions which usually confront the average man. You need the answers! **YOU CAN HAVE THEM, without cost, trouble, or delay.**

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For more than thirty-six years, this firm has been helping men with an inventive turn of mind. We maintain a large staff of trained, experienced specialists — **Registered Patent Attorneys, Draftsmen, and Searchers to help our clients secure all the protection to which they are entitled.** Fees are reasonable. Deferred payments frequently arranged. Questions promptly answered. Write us frankly with absolute assurance that what you say will be treated with strictest secrecy. **But FIRST,** send for the **FREE BOOKS** shown on the opposite page. They are filled with facts, pictures and suggestions. They tell you things about Patents, Inventions and Selling Inventions that we have learned in our long experience. **They may save you time, expense, EVEN LATER DISAPPOINTMENT. Simply fill in the coupon. No charge, no obligation. Write us today.**

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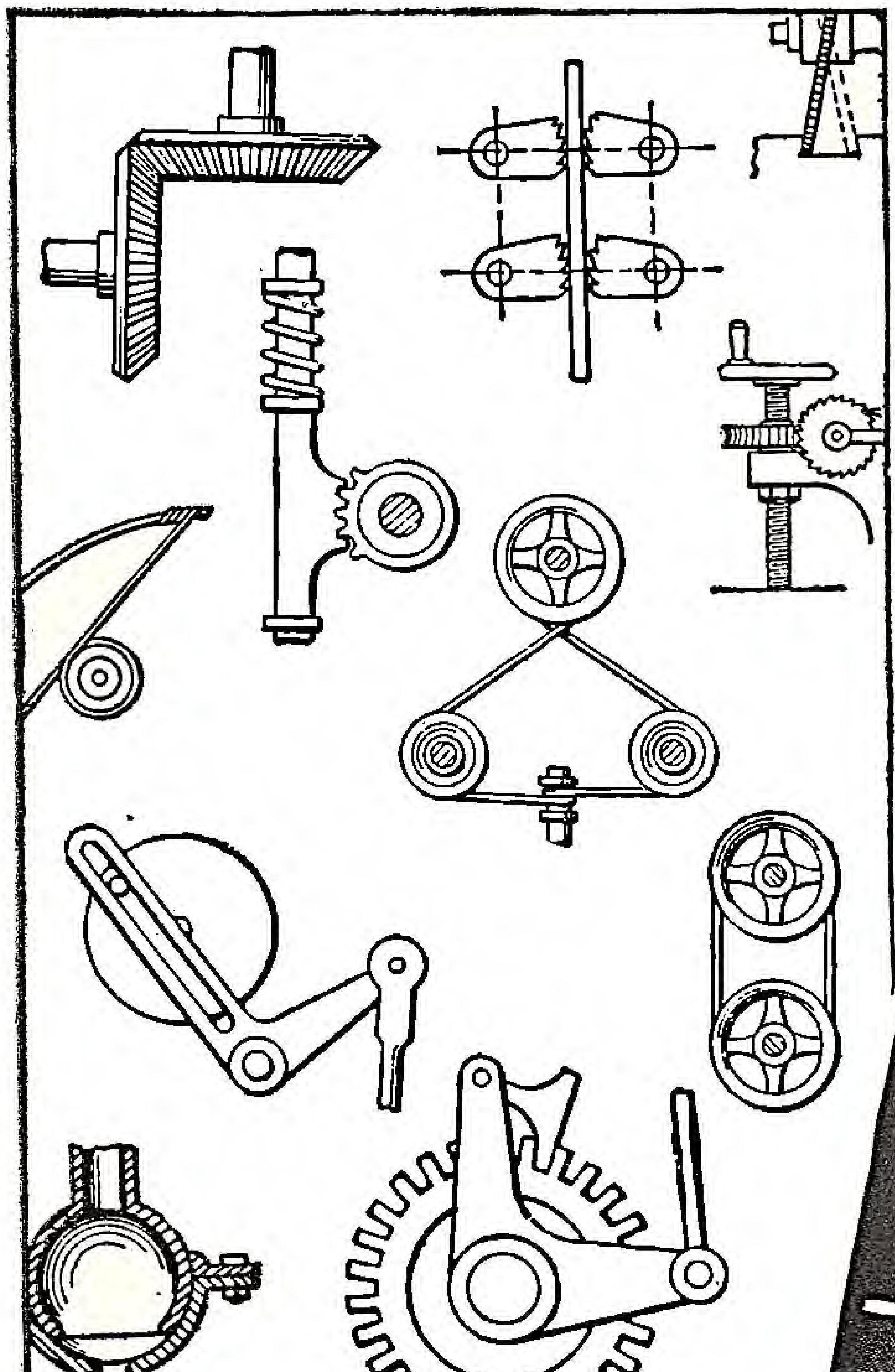

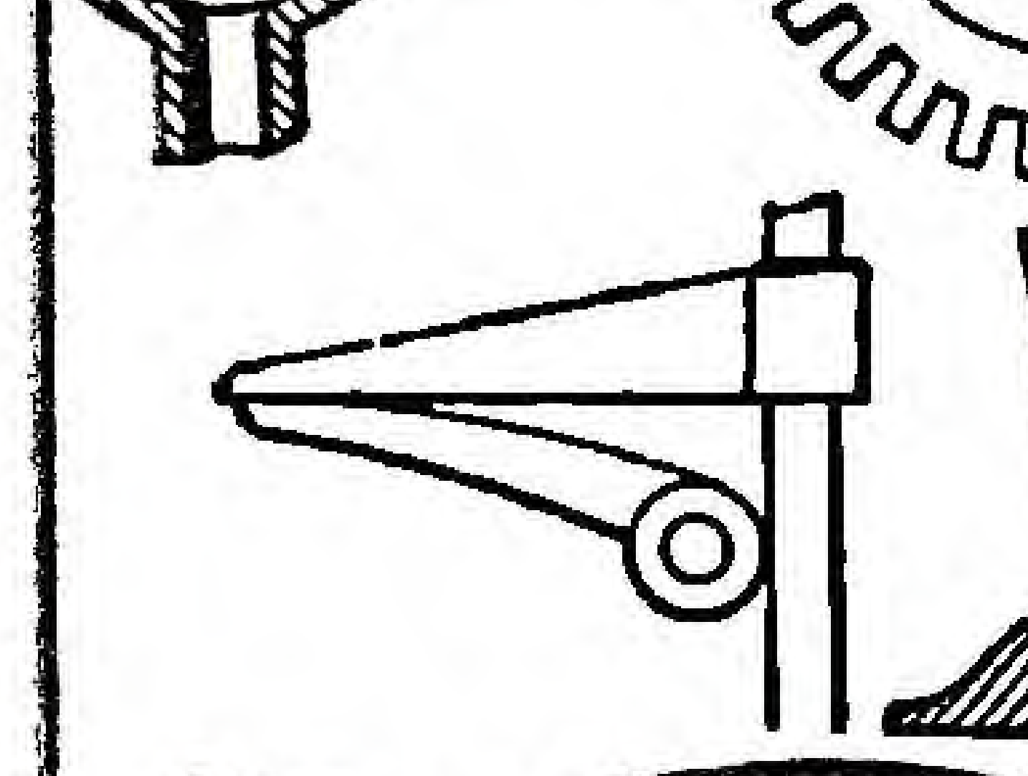

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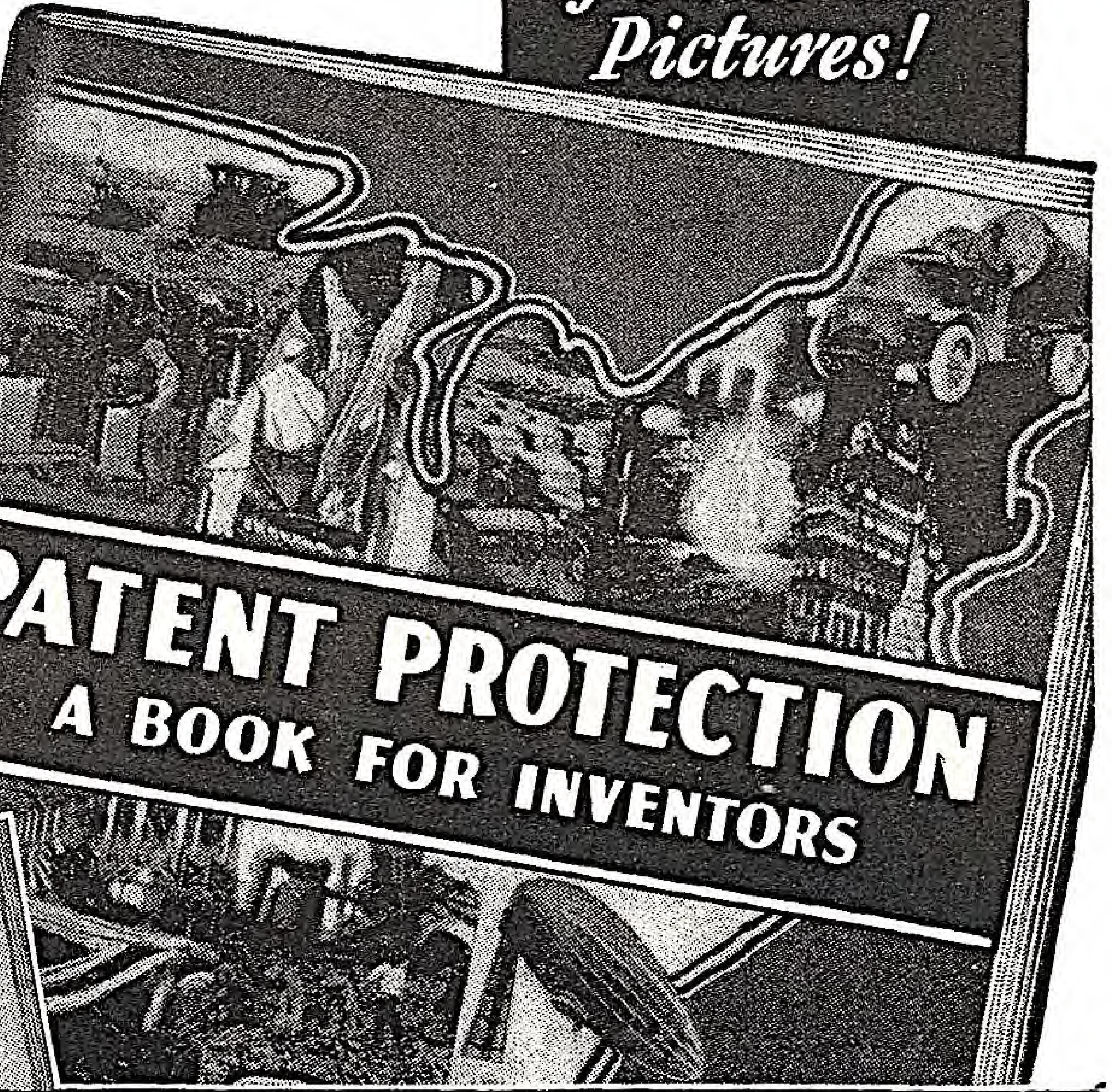

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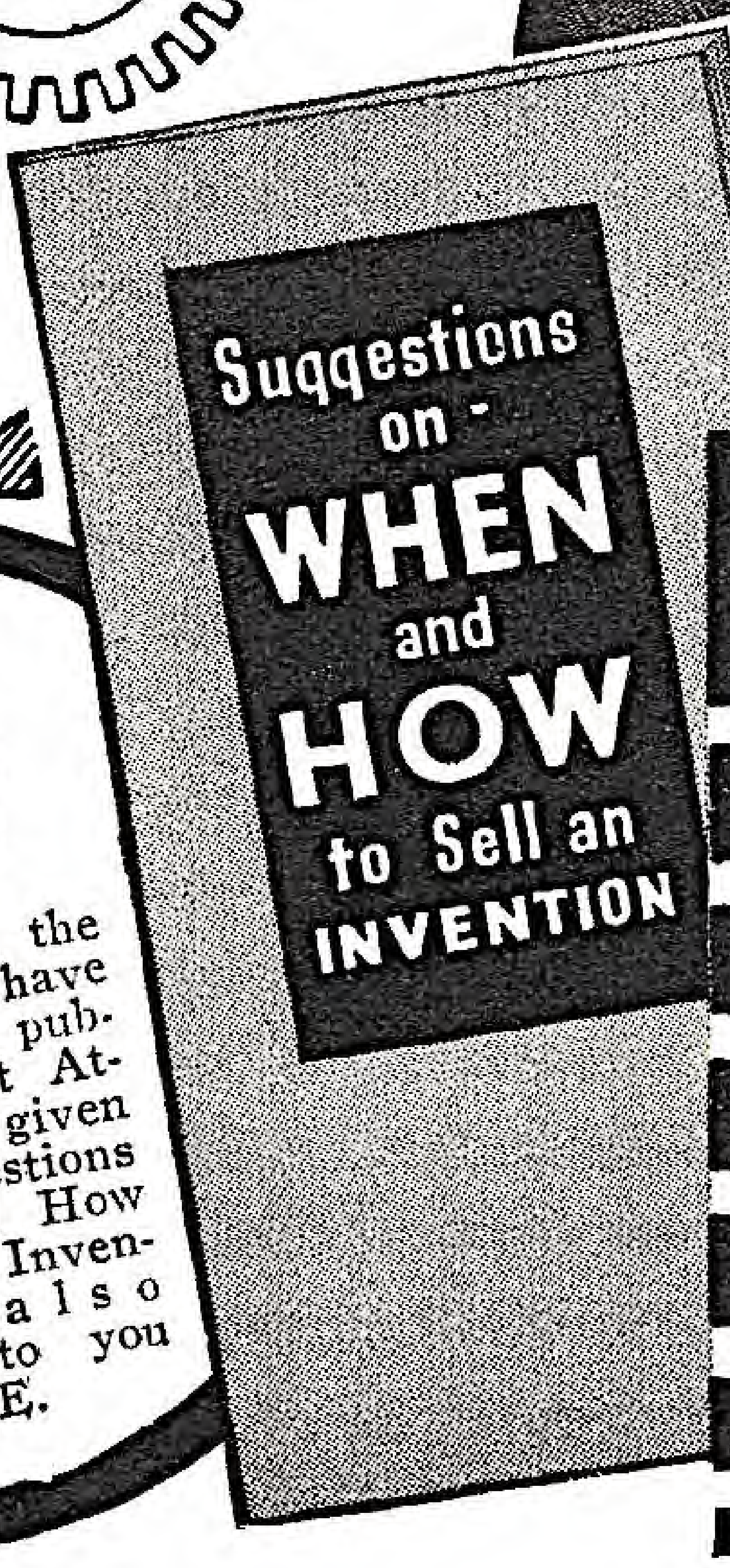

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- How to Improve Your Trolling
- Selecting Bait for Winter Fishing
- Identifying the Fish You Catch

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- Know the Fine Points of Duck Shooting
- Identifying Ducks
- Training Hunting Dogs
- Matching Wits with Pheasants
- Choosing a Gun for Upland Bird Shooting
- How to Get More Furs
- Bedding Down the Winter Hunter
- Preparing Hunting Camps
- Finding Your Way in the Woods
- Advantages of .22 Rifles in Hunting
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If you're dissatisfied with small pay—lay-offs and an uncertain future—here's an opportunity that's too good to miss. At the cost of only the time it takes you to mail the coupon, you can get my big FREE book, "RADIO'S FUTURE AND YOURS." This book tells how you can **learn at home under the supervision of factory engineers, to make more money** almost at once in Radio—whether you want to make Radio your life's work, or use it to pick up an extra $5 to $20 a week in your spare time.

TRAIN NOW FOR GOOD PAY FULL-TIME AND SPARE-TIME JOBS THAT PAY UP TO $75 A WEEK (and more)

Now is the time to get into Radio. **1935 was its biggest year.** Over 5 million new sets sold. Over 30 million dollars paid for service alone in 1935. Where only a few hundred men were employed a short time ago, thousands are employed today. And where a hundred jobs paid up to $75 a week—there are thousands of such jobs today—many paying even more. And new jobs are being created all the time—**full time jobs and spare time jobs.** Get my book and see how easy it is to learn at home for this good-pay work.

"Shop Training" for the Home

R-T-I Training is different than any training you ever heard about. It comes to you right from the heart of the Radio Industry—right out of the factories where Radio sets and other vacuum-tube devices are made. It was planned and prepared and is supervised by big radio engineers IN these factories—by men appointed for the purpose. This means that trained the R-T-I way, you'll be trained as the Radio Industry wants you trained—just as the Radio Industry, itself, would train you if it was doing the job.

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Radio service work is only the starting point in R-T-I Training. From there it will take you through the whole field of Radio and Electronics. You will learn about every new development, including Television so you'll be ready when Television breaks. You'll also learn the big money subjects such as Aviation and Auto Radio; Public Address Systems; how to handle Photo Cells; Sound Picture Recording, Etc.

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Start almost at once doing part time radio work. I furnish 4 outfits of apparatus that you build into test equipment with which you can do actual jobs and earn extra money. My Training pays its own way and you get your money back if not satisfied.

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You don't have to be a high school graduate, nor even have finished the grades. My Training is so simple, easy, and practical, that the average man, regardless of age, education, or previous experience can master it. It offers the chance you have wanted to get out of a small-pay, no-future job, into good pay work with a future, in Radio and all its branches.

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INVESTIGATE! Learn why R-T-I Training is different. Find out why R-T-I Trained men get "Quick Results" and "Big Results." Send for your copy of "Radio's Future and Yours" today. It tells you about Radio's amazing opportunities. It describes my approved training. It tells what R-T-I students are doing and making. It gives the history of my Advisory Board and 50 endorsing manufacturers. It's FREE. Clip, sign and mail coupon RIGHT NOW!

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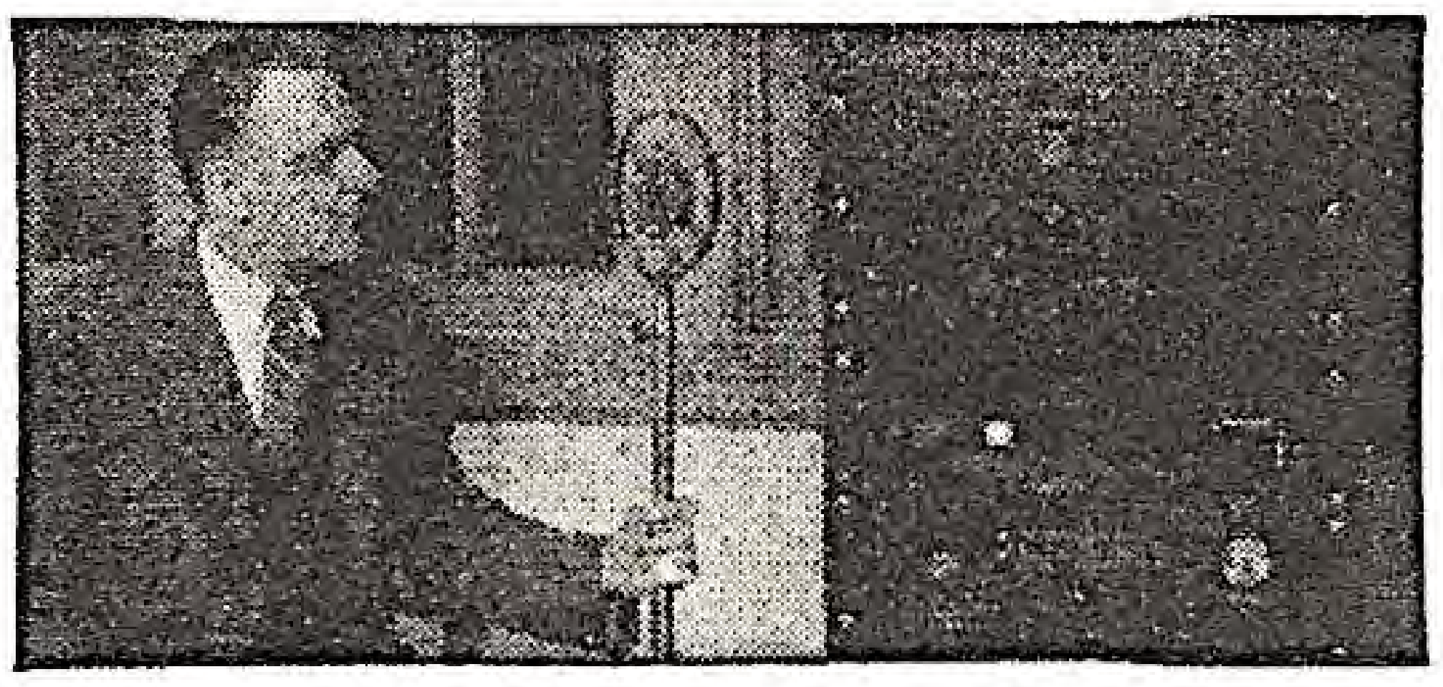
Wm. T. Ridd, Verdun, P. Q., Canada, formerly an $18 a week car washer, averages more than $75 a week as an R-T-I Trained man. He says: "Have made $250 in single week. R-T-I is entirely responsible for my success."



STARTING SALARY HIGHEST HE EVER EARNED

Harold Apley, 2658 Brookside Ave., Indianapolis, made as high as $30 a week in spare time while getting his R-T-I Training. Starting on a regular job, obtained because of his training he said: "This job is starting me in at better pay than I ever got on any job before."

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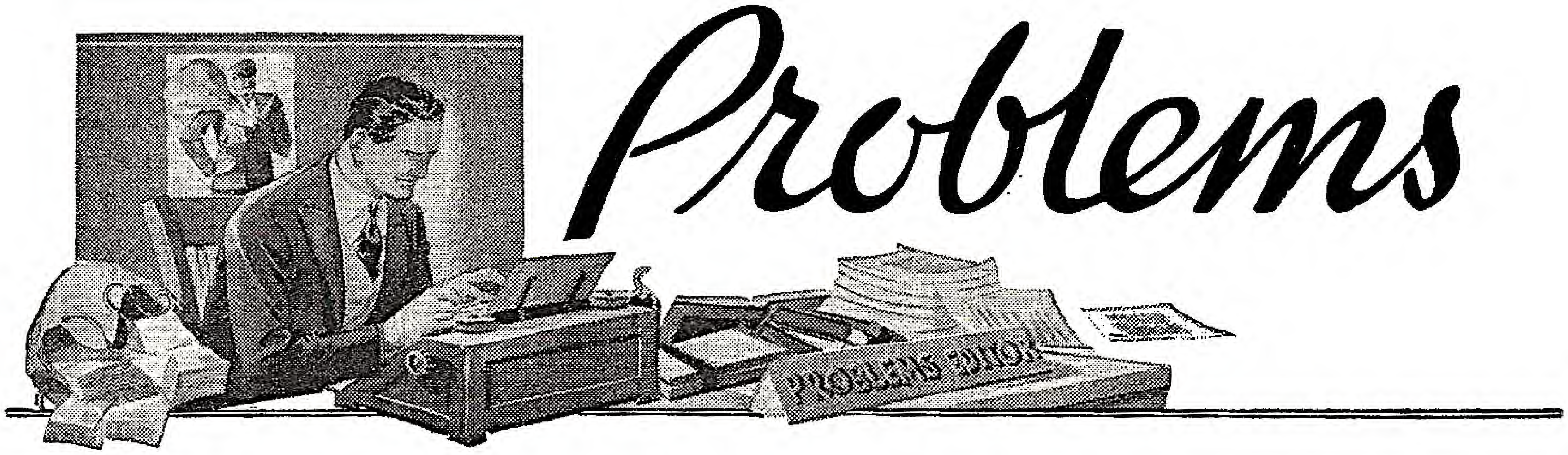


Your Questions Answered By M M's Editors

COOLING A CONVERTED BOAT ENGINE

I intend to use a four-cylinder automobile engine in a boat I propose to build. While it uses a radiator, isn't it possible for me to remove this? The motor in its present state takes up too much room.—J. V., Muscatine, Iowa.

Since the motor you intend to use is not new it is possible to use the lake or river water to cool your engine. Remove the fan and radiator and provide pipes to carry the water through the engine and out again. In this way the usual water pump of the motor is used in the cooling system.

SURFACING TENNIS COURTS WITH SALT

In your March issue I read with interest how salt was being used on third class highways in New York State to provide a hard surface. Might a similar method be used to provide a hard and durable surface for tennis courts.—R. R., Toronto, Ontario, Canada.

We believe that it is quite possible to use a salt surface on your tennis court. Use salt about the size used for packing ice cream and spread over the entire court. When this has been done either wait for a good rain or apply water to the court with a garden hose. If the court is being constructed mix the salt in with the clay and sand.

A PROPELLER FOR WIND CHARGERS

I have constructed a wind charger plant similar to the one described in your 1934 edition of the How To Build It Book. My problem, now, is a suitable propeller. Can you suggest a suitable propeller and tell me where I may secure plans for building it.—J. B. N., Copenhagen, Denmark.

A propeller suitable for use with a wind charger may be secured from a dealer in surplus airplane supplies. If you desire to make your own propeller, plans may be secured from MM's Blueprint Department at $1.50. These plans are full size and printed on tough rag content blueprint paper.

ENGINE TO OPERATE ARC WELDER

Will you please tell me if it is possible to use a two-cylinder motorcycle engine to run the arc welding generator, built from an auto generator, as described in the new MM Blueprint Booklet.—M. S., Bucyrus, Ohio.

A two-cylinder motorcycle engine should prove satisfactory for operating your arc welder. Some provision, though, should be made for water cooling or air blast cooling the engine so that it does not overheat and stall.

AUTO RUNS WHEN IGNITION IS OFF

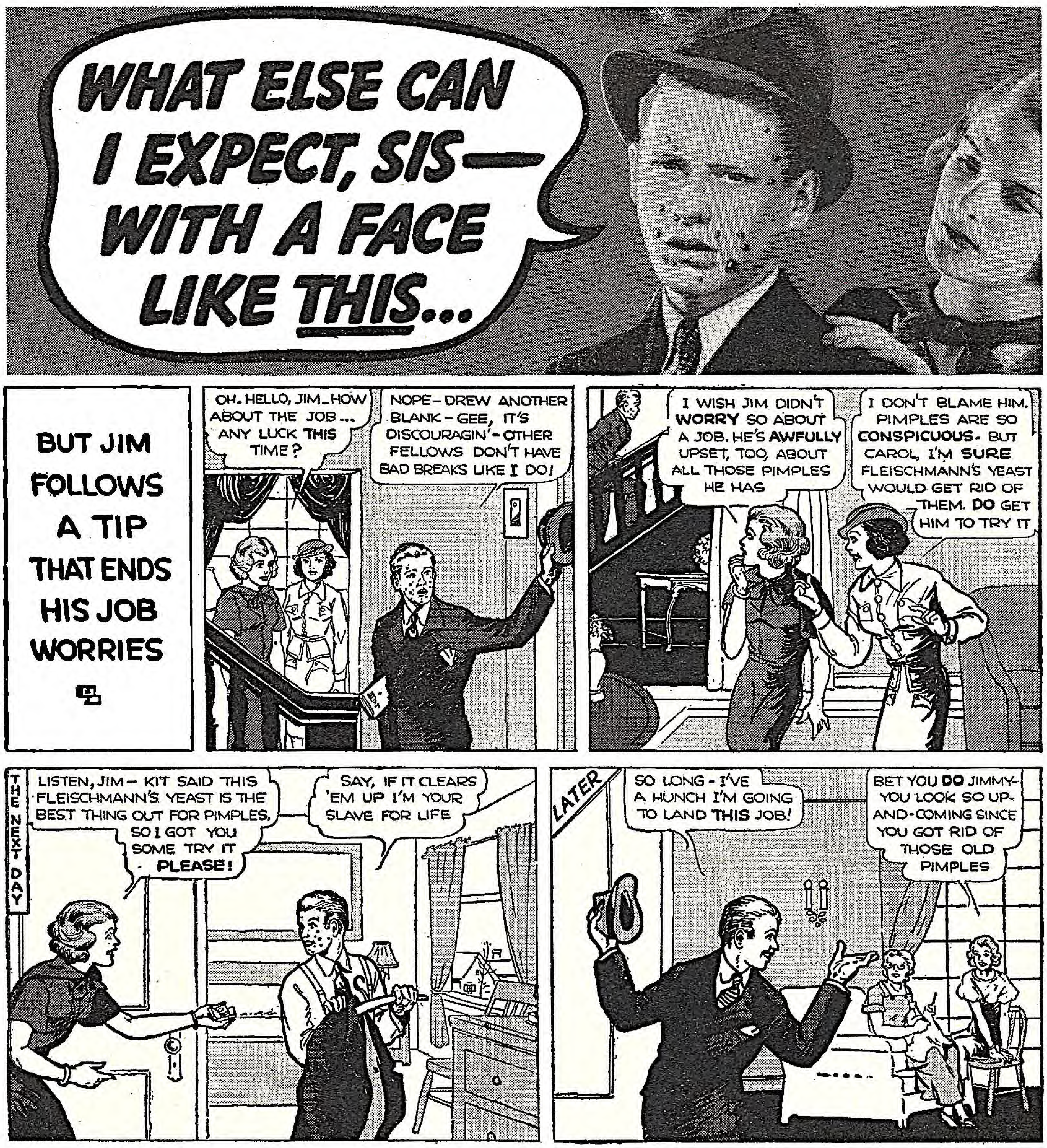
A few days ago I accidentally forgot to add water to my auto radiator which, at the time, was low. After driving the car for about one hour I was very much surprised to find that although the ignition key was turned off the car continued to run. I cannot understand what caused this strange action. My friends claim it is on this very same principle that diesel cars operate. Is this correct? —J. S. V., Dayton, Ohio.

With the water in your cooling system being extremely low the engine's mechanism developed a temperature sufficiently high enough to heat the exhaust valves to an almost red hot state. The heat of the valves naturally caused the gasoline vapor to explode although the ignition was turned off. This is not like the Diesel engine's operation since the Diesel depends upon the compression of the crude oil to provide the necessary explosion.

SUBSTITUTE MICROPHONE TRANSFORMER

In many of the radio construction articles appearing in *Modern Mechanix & Inventions Magazine* a microphone transformer is required. Living in a locality where parts are at a premium I was wondering if there is not some way in which an-

[*Continued on page* 18]


WHAT ELSE CAN I EXPECT, SIS— WITH A FACE LIKE THIS...
BUT JIM FOLLOWS A TIP THAT ENDS HIS JOB WORRIES
OH. HELLO, JIM—HOW ABOUT THE JOB... ANY LUCK THIS TIME?
NOPE—DREW ANOTHER BLANK—GEE, IT'S DISCOURAGIN'—OTHER FELLOWS DON'T HAVE BAD BREAKS LIKE I DO!
I WISH JIM DIDN'T WORRY SO ABOUT A JOB. HE'S AWFULLY UPSET, TOO, ABOUT ALL THOSE PIMPLES HE HAS
I DON'T BLAME HIM. PIMPLES ARE SO CONSPICUOUS. BUT CAROL, I'M SURE FLEISCHMANN'S YEAST WOULD GET RID OF THEM. DO GET HIM TO TRY IT
THE NEXT DAY
LISTEN, JIM—KIT SAID THIS FLEISCHMANN'S YEAST IS THE BEST THING OUT FOR PIMPLES, SO I GOT YOU SOME TRY IT PLEASE!
SAY, IF IT CLEARS 'EM UP I'M YOUR SLAVE FOR LIFE
LATER
SO LONG—I'VE A HUNCH I'M GOING TO LAND THIS JOB!
BET YOU DO JIMMY—YOU LOOK SO UP-AND-COMING SINCE YOU GOT RID OF THOSE OLD PIMPLES

3 MONTHS LATER
PRIVATE
WHAT D'YOU KNOW—THEY'RE GIVING ME A RAISE AND A BETTER JOB—GOSH, I CAN HARDLY BELIEVE MY LUCK!
OH, JIM—HOW PERFECTLY GRAND!

Don't let Adolescent Pimples keep YOU down on your luck

After the start of adolescence—from about 13 to 25, or longer—important glands develop. The entire system is disturbed. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin, causing pimples to appear.

Fleischmann's Yeast clears these skin irritants out of the blood. Pimples go! Eat 3 cakes a day, before meals—plain, or in a little water—until skin clears.

—clears the skin
by clearing skin irritants out of the blood

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PATENTS

DELAYS ARE DANGEROUS IN PATENT MATTERS

The Free Book shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

Small Ideas May Have Large Commercial Possibilities

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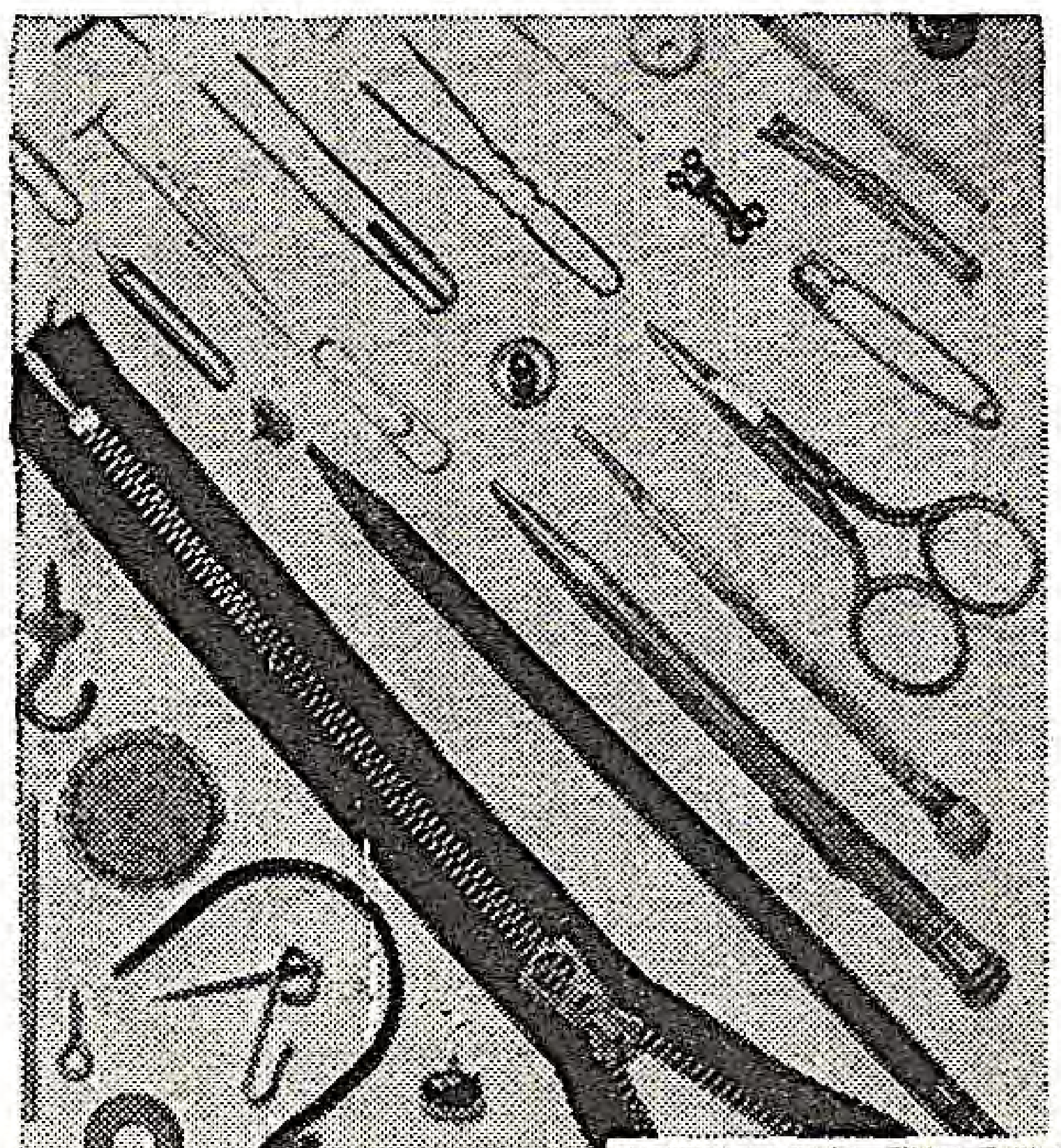

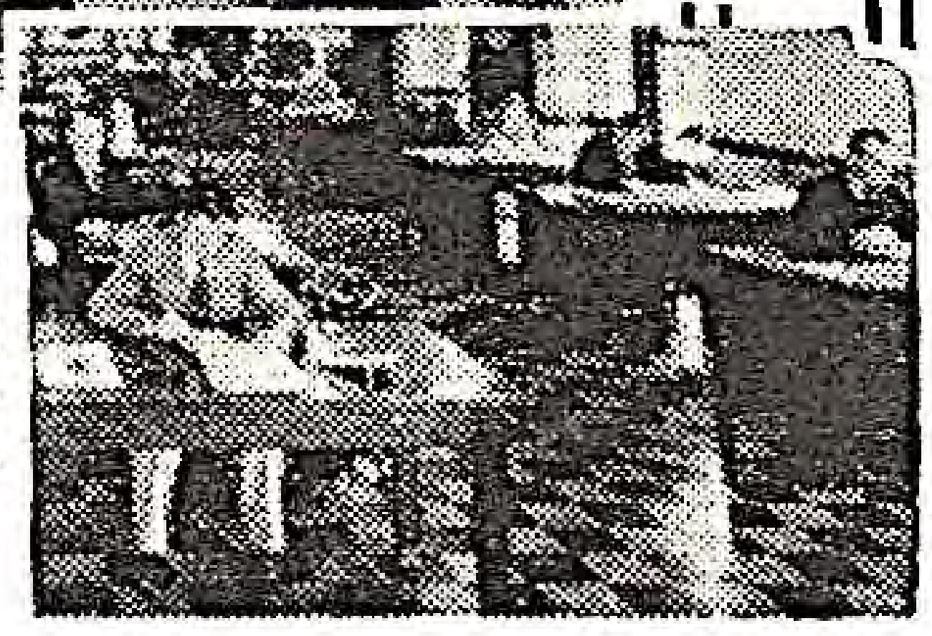

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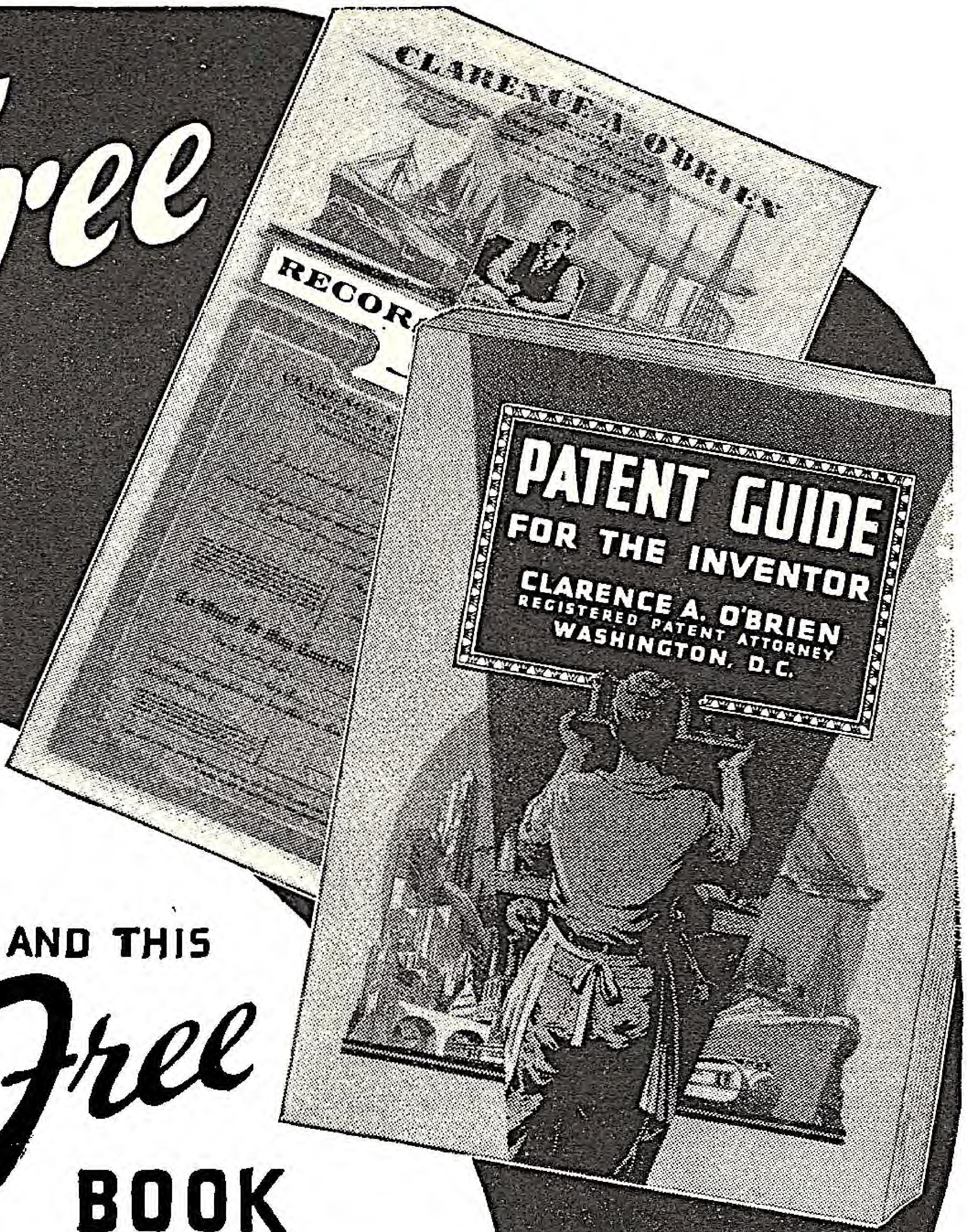

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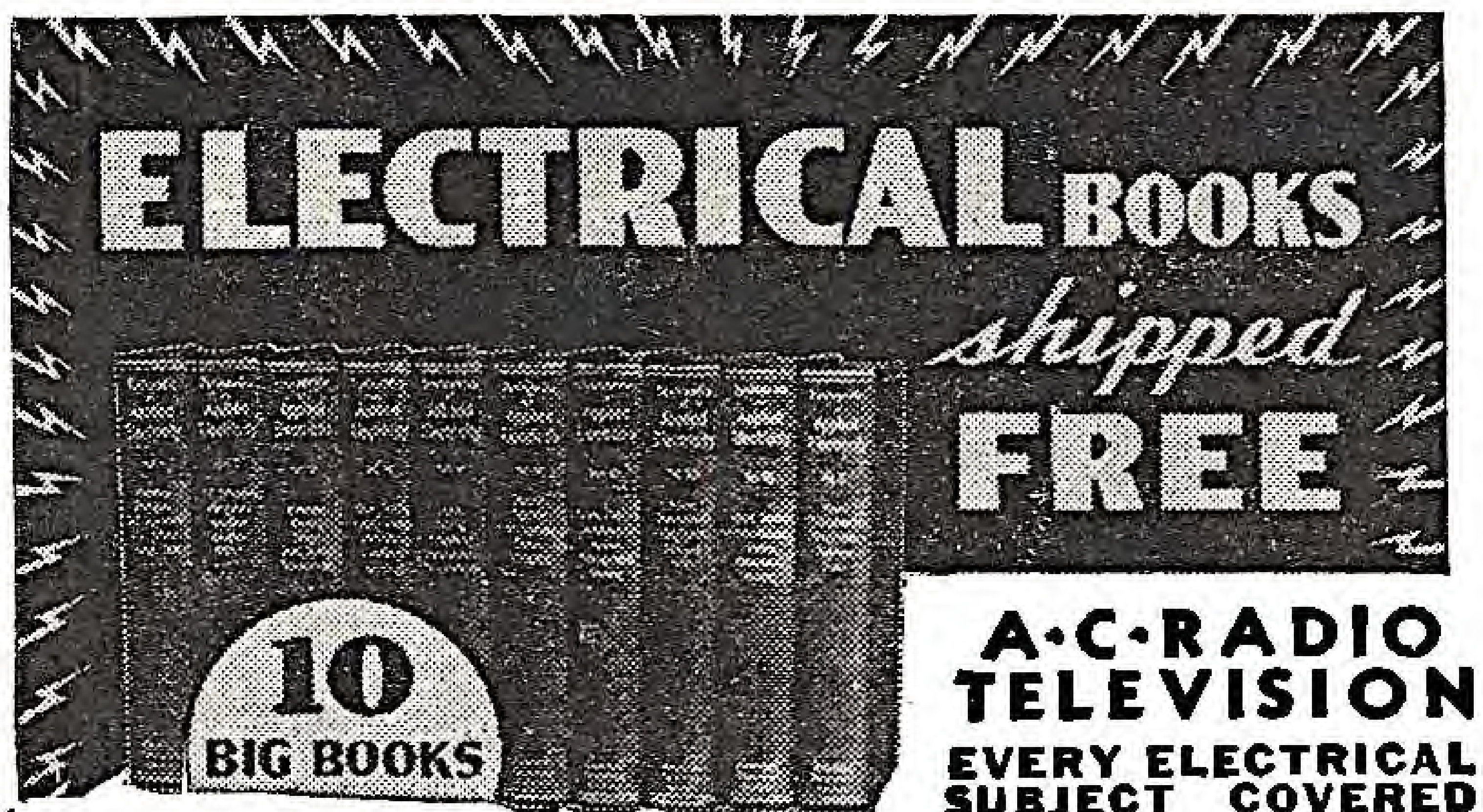

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Please attach letter stating age, occupation and name and address of employer and at least one business man as reference.

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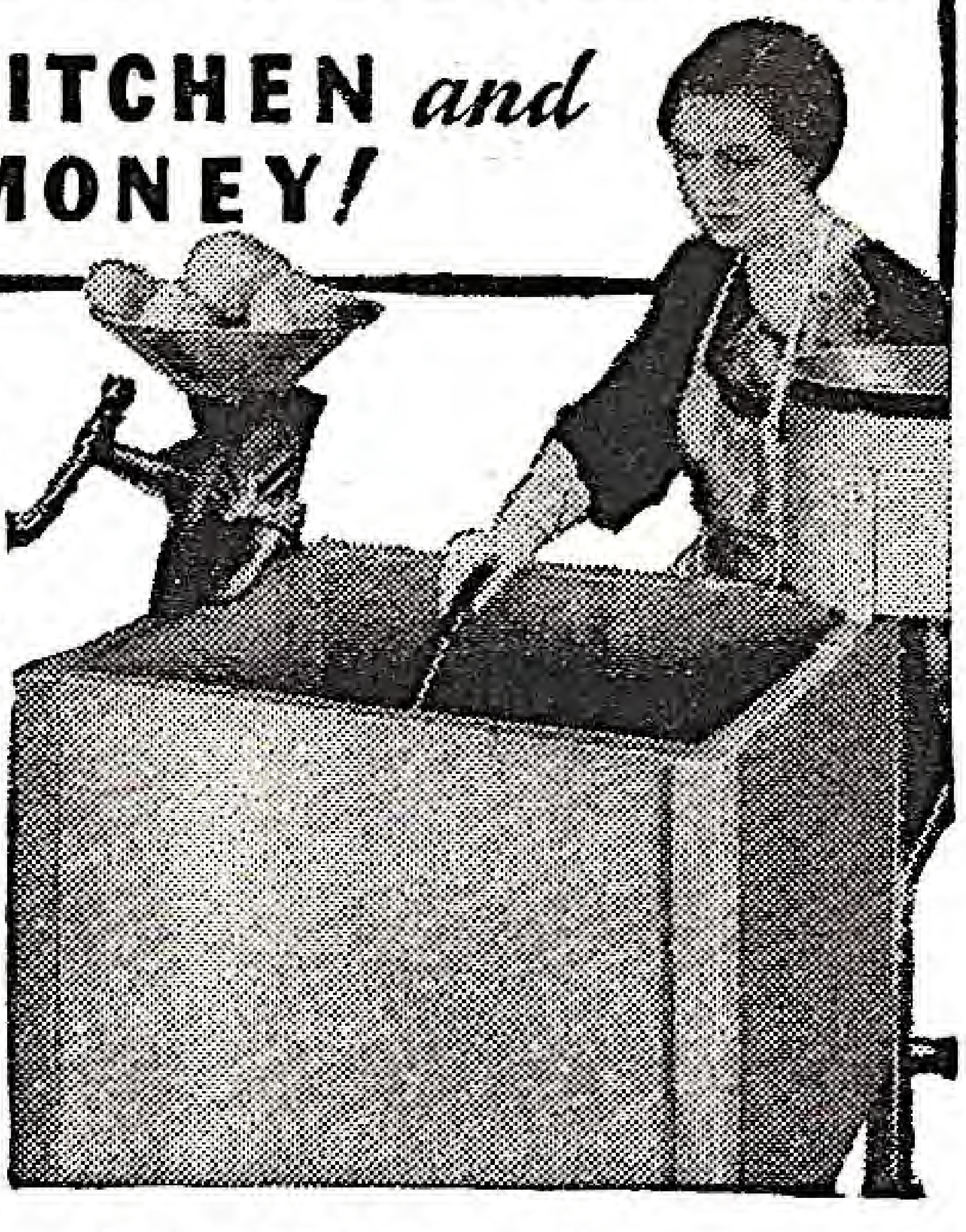

Buy Potatoes for 2c A POUND
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THERE'S big money in potato chips for any man or woman who wants a business capable of paying as much as $23.50 a day in profits. Just think of it. You can install the wonderful new machine in your kitchen—just manufacture and sack a sensational new kind of "Greaseless" Potato Chip—and let the stores sell them for you. Only $2.50 invested in raw materials brings back $10.00 in cash.

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G. H. Hardt, 325 W. Huron St., Dept. 246, Chicago, Illinois

Problems Editor Answers Queries

[*Continued from page 14*]

other type of transformer could be substituted. I have often heard that a door bell transformer could be used for this purpose but I do not know whether this is true. Do you know if this idea is practical and how it is accomplished?—V. O. D., Racine, Wis.

It is possible to substitute a door bell transformer for the regular type provided the microphone is one having a single button. It will not function with a double button microphone. Connect the microphone to the primary of the bell transformer through a 1½ or 3-volt battery just as you would any other, then connect the heavy (110-volt) leads of the transformer to the amplifier or other device you are experimenting with. While not as satisfactory as a commercial product the bell transformer is a fair substitute.

CHEMICAL PLATING vs. ELECTRO PLATING

In recent issues of *Modern Mechanix & Inventions Magazine* I have read interesting articles on both electro and chemical plating. Which is the best?—S. I., Chicago, Ill.

For a lasting plate only the electric process should be used. A chemical plating is satisfactory only on small articles not exposed to the elements.

(Editor's Note: Your questions will be answered personally and free of charge by MM experts provided they do not require special research or involve trade secrets. Names and addresses of manufacturers of new products described in this issue can also be obtained free upon request. Enclose a self-addressed and stamped envelope for reply. Address: Problems Editor, Modern Mechanix Publishing Co., Greenwich, Conn.)

ANSWERS TO MM MEMORY TESTERS

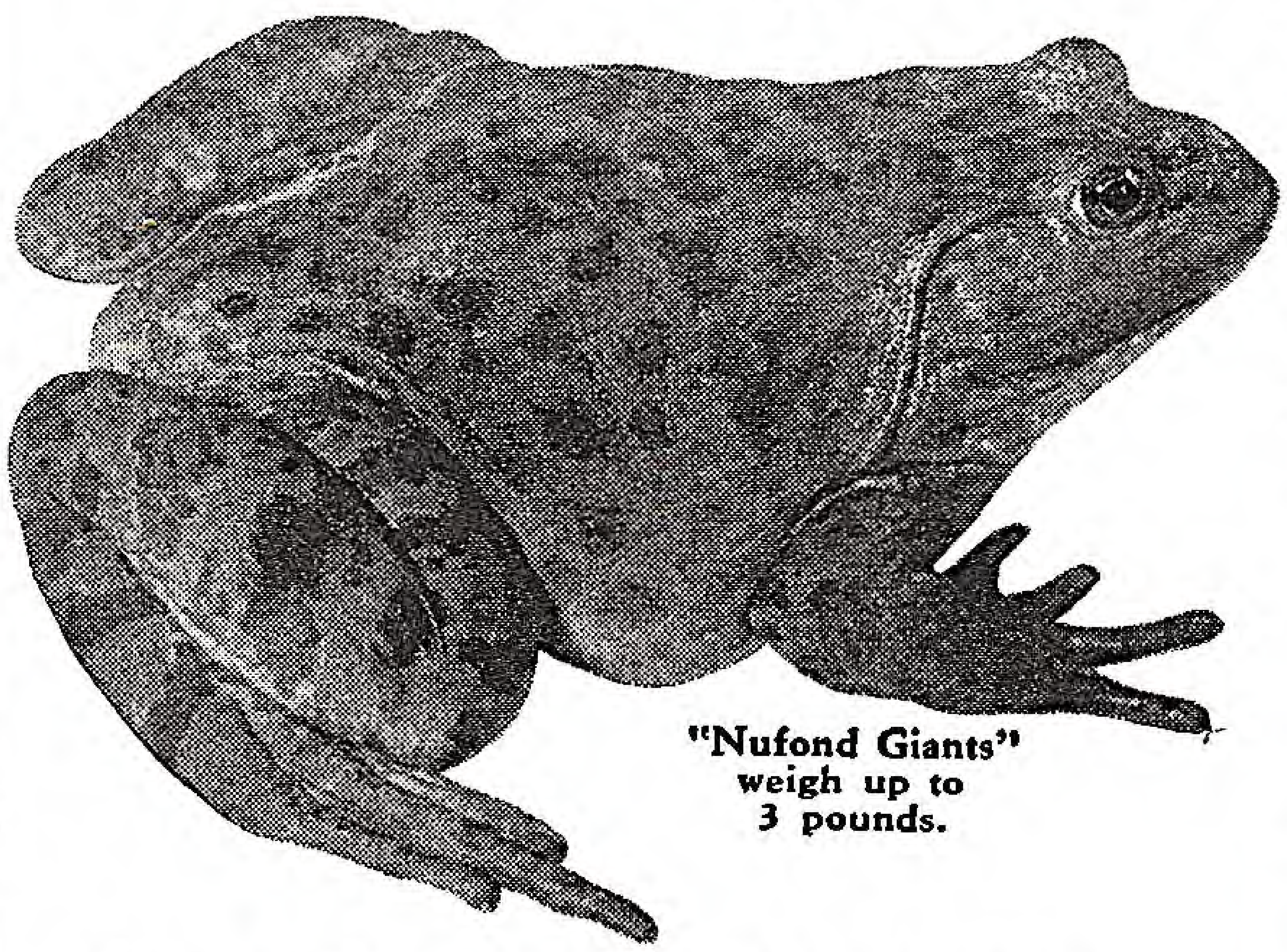
Due to the response from our readers the answers to the "MM Memory Testers" were not compiled in time for publication in our May issue. The correct answers to the twenty questions appear below:

1—(e)
2—(a)
3—(c)
4—(b)
5—(b)
6—(e)
7—(b)
8—(b)
9—(a)
10—(c)
11—(d)
12—(b)
13—(c)
14—(a)
15—(b)
16—(b)
17—(b)
18—(b)
19—(c)
20—(c)

Of the many letters received only two were accompanied with perfect scores. The lowest rating for all entries was a score of 55% while the average was a grade of 82%. The editors appreciate the interest that was shown by the many readers who submitted answers and thank them for their cooperation.

Raise Giant Frogs

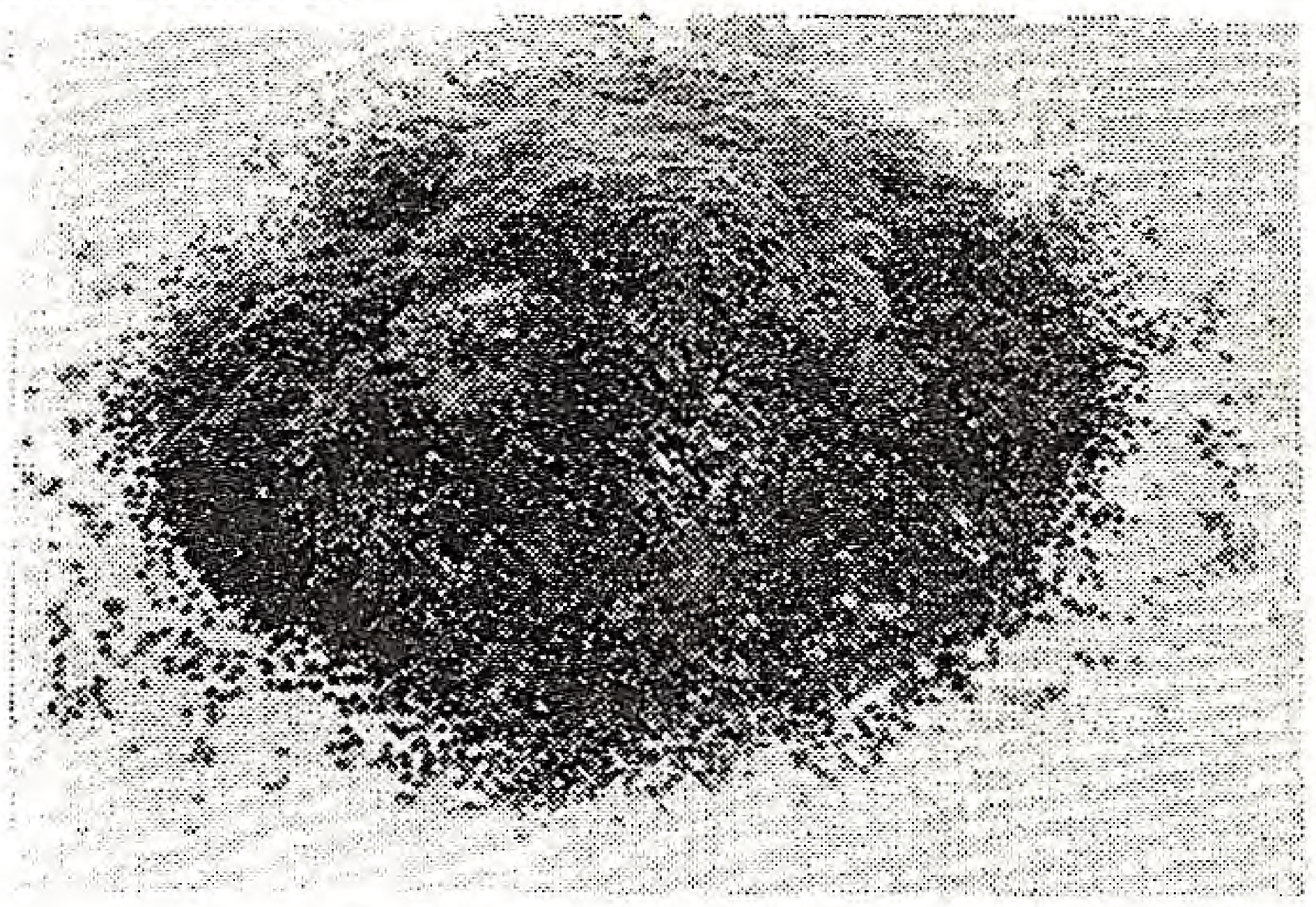
We Buy What You Raise



"Nufond Giants" weigh up to 3 pounds.

Good Profits—No Competition

Each pair of "Nufond Giant" breeders lay 10,000 eggs every year. With modern methods, up to 90% turn into frogs. **We pay you up to $5.00 per dozen for "Nufond Giants".** Think of the profit possibilities! Competition is unknown because the wild supply is practically exhausted.



10,000 Eggs from Each Pair

Start In Your Backyard

A small backyard pond 20x25 feet with a little bank space is all you need to start. The pond is very shallow; little water is needed. Expand with the offspring.

Any kind of drinking water is suitable. Running water is not required. Flowers, lilies and plants make the pond very attractive.

A model backyard frog pond

Any Climate Suitable

"Nufond Giants" are a hardy breed of "North American" bull-frogs. You can raise them in the North or South, even in Canada.

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A frog pond is easy to make. There is nothing to buy except fence! You even raise the food right in the pond with the frogs! What other livestock offers you such advantages?

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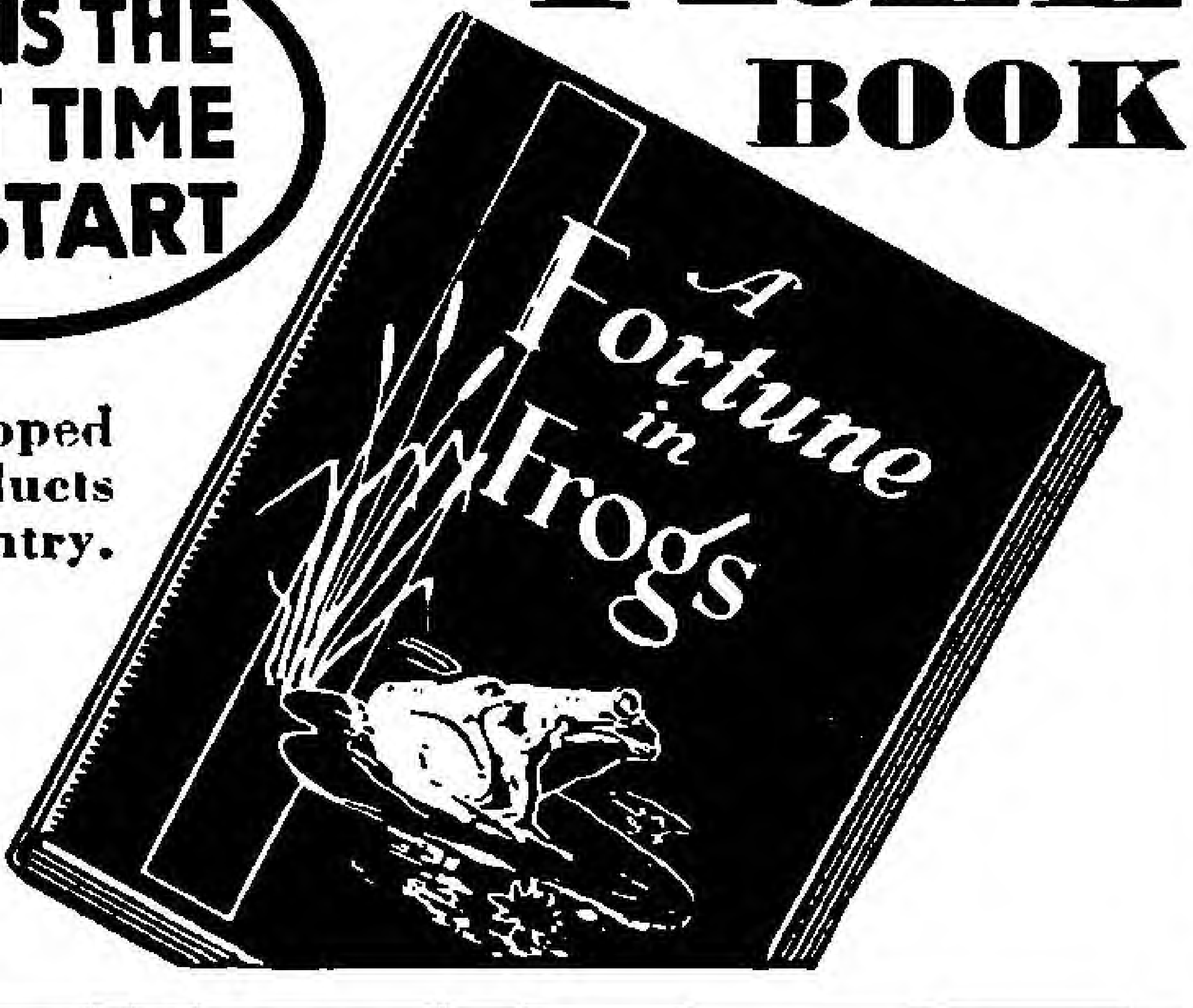

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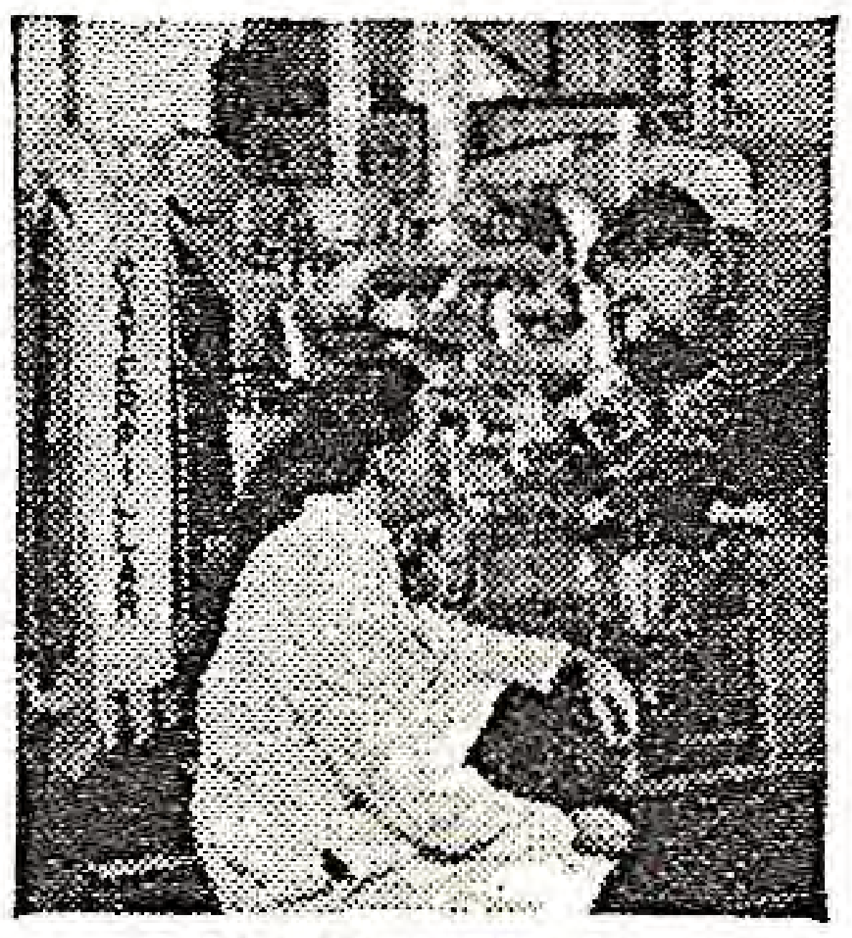

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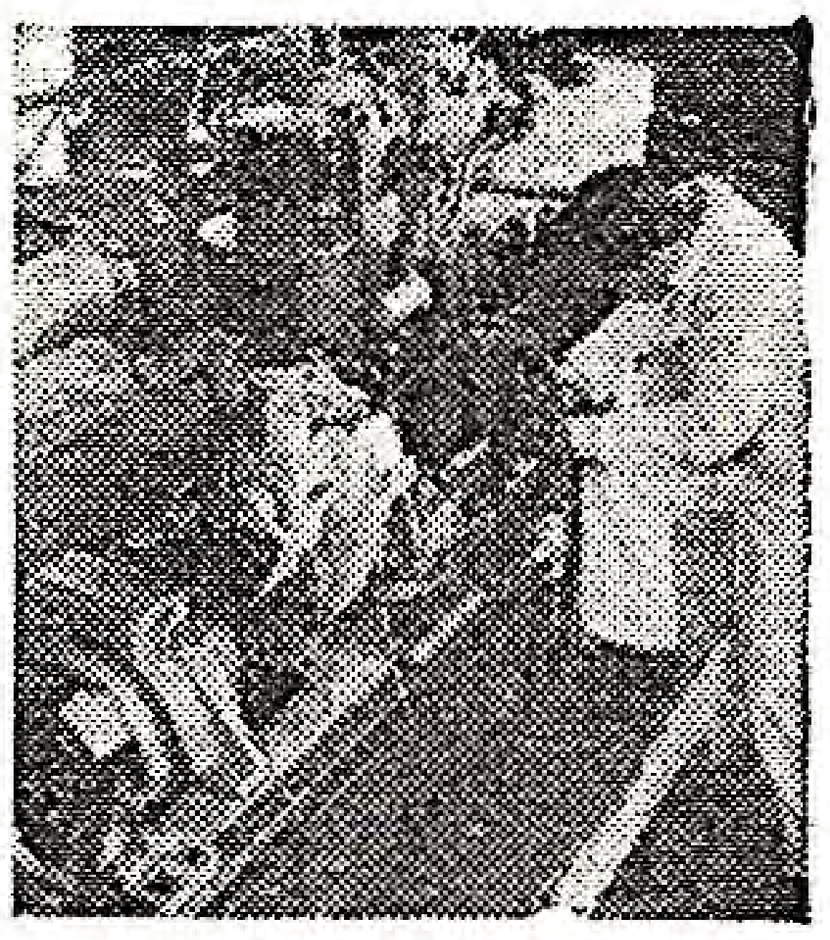

Testing Mianus Marine Diesel.

Checking Pump on McCormick-Deering

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What Strange Powers Did the Ancients Possess?

EVERY important discovery relating to mind power, sound thinking and cause and effect, as applied to self-advancement, was known centuries ago, before the masses could read and write. Much has been written about the wise men of old. A popular fallacy has it that their secrets of personal power and successful living were lost to the world. Knowledge of nature's laws, accumulated through the ages, is never lost. At times the great truths possessed by the sages were hidden from unscrupulous men in high places, but never destroyed.

Why Were Their Secrets Closely Guarded?

Only recently, as time is measured; not more than twenty generations ago, less than 1/100th of 1% of the earth's people were thought capable of receiving basic knowledge about the laws of life, for it is an elementary truism that knowledge is power and that power cannot be entrusted to the ignorant and the unworthy.

Wisdom is not readily attainable by the general public; nor recognized when right within reach. The average person absorbs a multitude of details about things, but goes through life without ever knowing where and how to acquire mastery of the fundamentals of the inner mind—that mysterious silent something which "whispers" to you from within.

Fundamental Laws of Nature

Your habits, accomplishments and weaknesses are the effects of causes. Your thoughts and actions are governed by fundamental laws. Example: The law of compensation is as fundamental as the laws of breathing, eating and sleeping. All fixed laws of nature are as fascinating to study as they are vital to understand for success in life.

You can learn to find and follow every basic law of life. You can begin at any time to discover a whole new world of interesting truths. You can start at once to awaken your inner powers of self-understanding and self-advancement. You can learn from one of the world's oldest institutions, first known in America in 1694. Enjoying the high regard of hundreds of leaders, thinkers and teachers, the order is known as the Rosicrucian Brotherhood. Its complete name is the "Ancient and Mystical Order Rosae Crucis," abbreviated by the initials "AMORC." The teachings of the Order are not sold, for it is not a commercial organization, nor is it a religious sect. It is a non-profit fraternity, a brotherhood in the true sense.

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Scribe: E. O. Z., Rosicrucian Brotherhood, San Jose, California. Please send copy of sealed booklet, "The Secret Heritage," which I shall read as directed.

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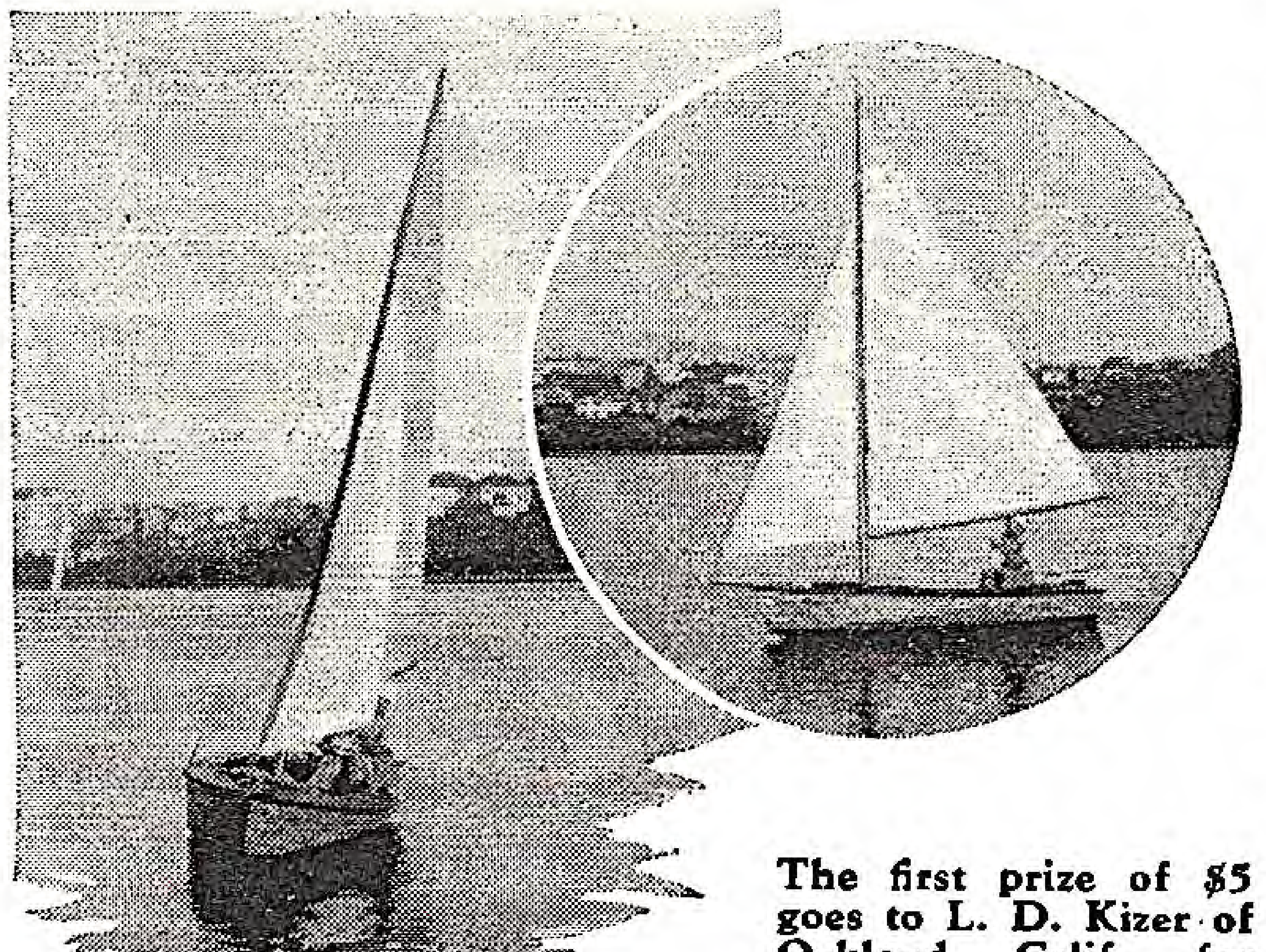


The first prize of $5 goes to L. D. Kizer of Oakland, Calif., for the novel kinks he used in building *Nomad*.

THIS issue brings you the last installment in MM's big $1,000.00 Automobile Identification contest and all of you who have not already done so should dig up the April and May issues and start identifying the cars so that your entries won't arrive too late. As we pointed out in an earlier issue, the prizes are big enough to outfit a brand new workshop with the latest equipment. You will find all the details on Page 46.

***

This is the time of the year when the spring fever bug gets into the old system and you would rather be out in the sun on some warm bank dreaming about the things you are going to build, as soon as you get the ambition. Don't let the bug get you down this year. Remember how you went all last summer without that boat you were going to build? And the garden furniture? And the countless other projects that could have made your summer more enjoyable? Turn to the How-To-Build features in this issue and start to work. If you want more projects, send for our free blue print booklets. Make this summer a profitable one.

***

As we predicted last month, this is going to be a season of boat building, and not because of the terrible floods which have been inundating the country either. There is something about a boat, no matter what kind, which makes everyone want to build one of his own. L. D. Kizer felt this urge when he ran across our plans for *Nomad*, one of the boats featured in our book, *How To Build 20 Boats*. He promptly set to work, and did such a good job that he won the first prize of $5 in our monthly Editor's Workbench Contest. Here is how he did it:

Oakland, Calif.

Dear Editor:

I am sending a photo of the boat I built from your plans of the "Nomad," and am very pleased with it. I made the cockpit larger and had to make some change in my sails for proper balance.

I now have an 18-inch bowsprit to carry my large, overlapping jib, which now measures 12′ 6″x11′x6′ 6″. This change brings my center of effort back six feet, two inches from the stem. This point is just one foot, two inches ahead of the center of lateral resistance. The boat now balances beautifully and will point almost into the wind without any extra rudder.

Here's something new. Wishing to economize, I built the hull of miscellaneous lumber and covered it with galvanized sheet iron. Altogether the boat cost me but $20 not counting my labor in building her.

L. D. Kizer.

$750.00 Scrambled Photo Winner Writes of Experiences

Brooklyn, N. Y.

Dear Editor

This is to acknowledge the receipt of your check for $750. I can hardly express how thrilled I was to receive the first prize. It has been my habit in the past—need I say anything of the future—to read the pages of MM. I am an interior decorator, and MM gives me ideas. It was my good fortune to buy the magazine when the contest was announced. I decided to enter, and went into conference with my son.

"Listen, dad," he explained, "this contest requires skill, cleverness, and ability. Let me tell you the people who read this magazine are craftsmen. They can use their hands and their brains. And it's going to take a great deal of ingenuity to express their slogan in 10 words or less."

That word "Ingenuity", carelessly mentioned, furnished the key to our slogan—The Monthly Review Of Human Ingenuity.

I had given up all hope from the day I sent my "Hall of Fame" away. This was my first real contest, and I thought the publisher's nephew or some other relation would get first prize. At least that was what people always told me about contests.

It wasn't until the last week of the contest that I had time to work on my idea. I didn't see how I could finish it in a week. I still don't understand how I did it. I managed to have the building completed by six o'clock on the evening of Jan. 3, and entries had to be postmarked by that date.

Here was a nerve wracking situation. We had to build a crate, get a truck, and deliver the box at the express office before 8 p.m. when the office closed. By dint of hard work, and the wildest ride I ever took in my life, we arrived at the office at 7:58 p.m., with just two minutes to spare.

As we look back at it now, it was a grand adventure. We had a lot of fun, and it paid cash dividends. We spent exactly $7.50, and got back a dollar for every penny.

Gerald Damush.

***

That letter should answer a lot of questions concerning alterations in sail plans. It can be done, provided you are as careful as Mr. Kizer was in figuring out his centers of effort and lateral resistance before making the changes. These

the Editor's Workbench

centers of effort and lateral resistance have been the bogey men of many boat builders, but they are carefully explained in our book, *How To Build 20 Boats.*

***

"The Olympic Monotype I built from your plans won the cup offered by the King Yacht Club, Toledo, Ohio, last summer. It won the highest number of points in a series of 20 races. The second place was also won by an Olympic built from your blueprints," writes E. P. Schweitzer of Toledo.

***

Getting away from boats for a moment, but still sticking close to the water, we award our second prize of $3 in our work bench contest to Robert Forstian for his diving helmet. He writes:

Durhan, N. C.

Dear Editor:

I am enclosing a picture of a diving helmet I made from plans published in one of your earlier magazines. This picture was taken before the phones were installed. It was very successful. I would like to hear from some of the other boys interested in diving.

Robert Forstian.

"I would like to hear from other boys interested in diving," writes Robert Forstian, who wins second prize of $3 in this month's Workbench Contest.

"Sincere Thanks for $300.00" Writes Second Prize Winner

Marshalltown, Iowa.

Dear Editor:

Will you kindly accept the sincere thanks of my wife and myself for your check for $300.00—the second prize in your recent Scrambled Photos contest?

First and foremost a good share of it will go into the home we are buying. Then I am going to add a few much desired pieces to my workshop. A nine-year-old son is sometimes hard on saws, planes, etc., and so some of them must be replaced. We hope, too, to put a bit of the money away toward the boy's future education.

Your magazine is a splendid aid to us amateur carpenters and I hope you will continue to give us more of your excellent contests.

George A. Beecher.

***

The great floating palace, the Queen Mary, is now receiving her final check-up preparatory to sailing for the United States in June. The beautiful lines of this super-boat are proving a model builder's delight. You can build a mantel-size Queen Mary from MM blue prints made to actual size of model. The prints sell for 75 cents.

***

Builders of *Tiny Tom,* our pencil length model locomotive will find some helpful construction hints in this third prize winning letter from Irvin Streng of Chicago, Ill. He became so engrossed in the model he finally bought a lathe to rush the work. His letter follows—

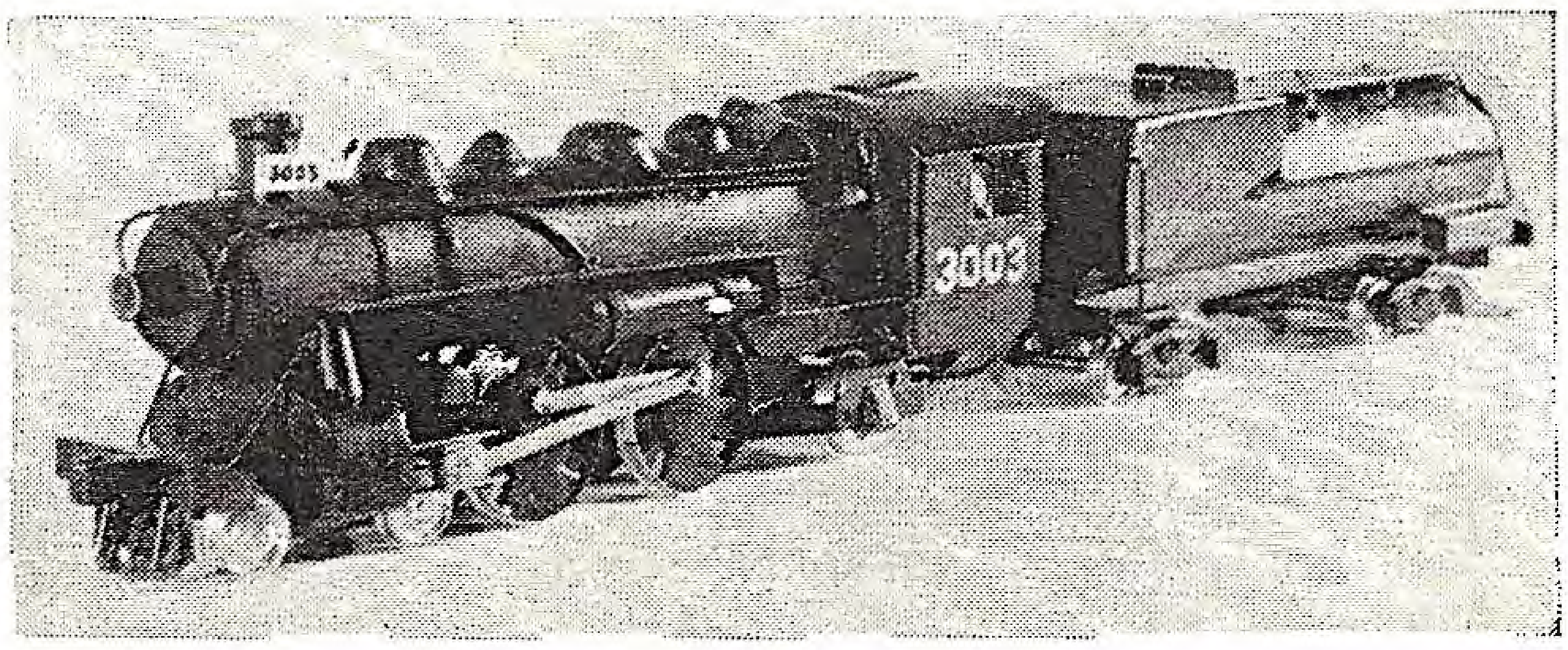
Chicago, Ill.

Dear Editor:

I have just completed a model of "Tiny Tom" from the plans published in MODERN MECHANIX & INVENTIONS

[*Continued on page* 25]

Irvin Streng, our third prize winner this month, is shown inspecting his completed model of "Tiny Tom," MM's pencil length locomotive. He became so interested in his model that he bought a lathe to rush the job.



Here is a close-up of Streng's "Tiny Tom." The drive wheels were made up of brass sheets soldered together and turned out on lathe. All parts were made at home except the motor.

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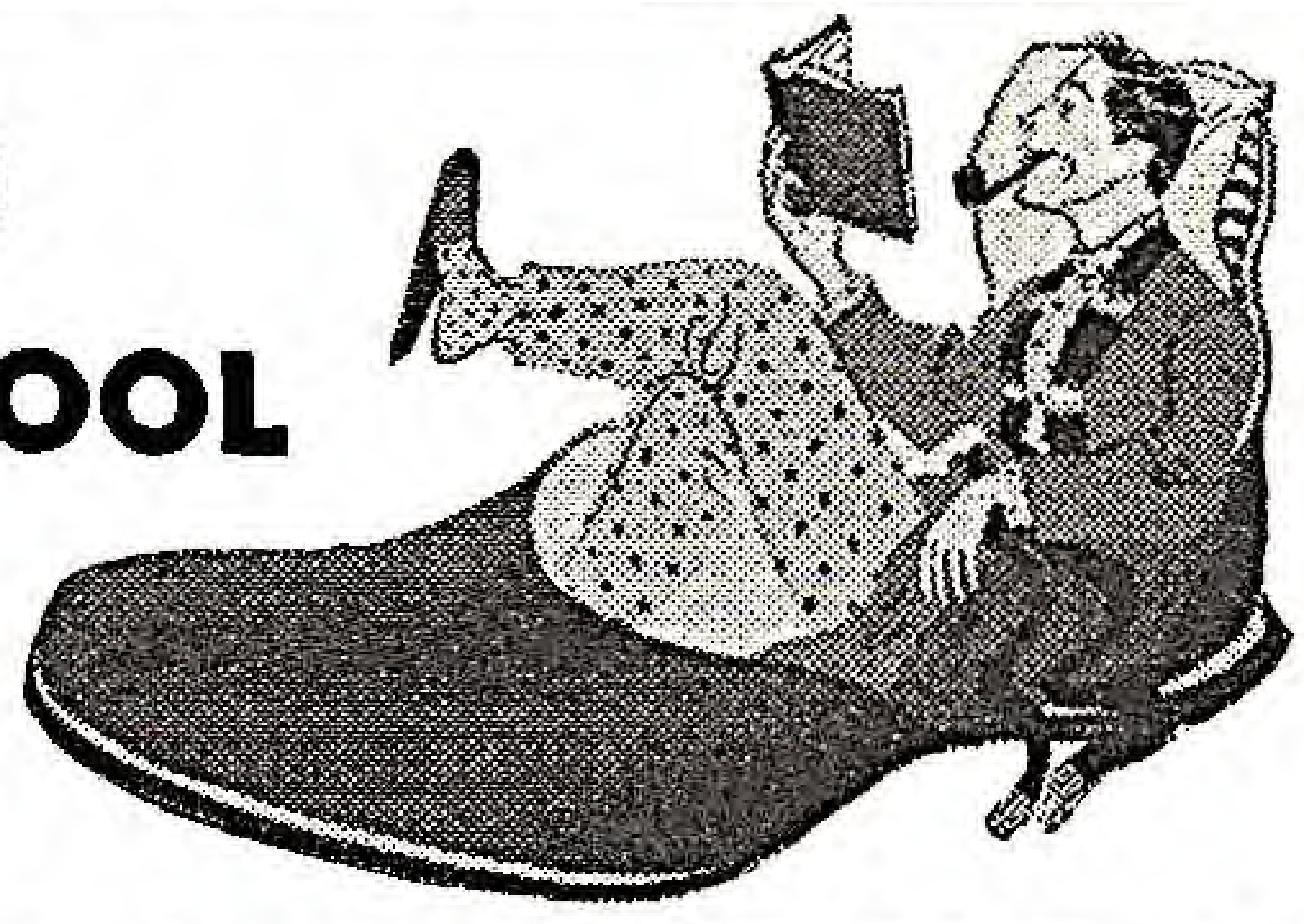

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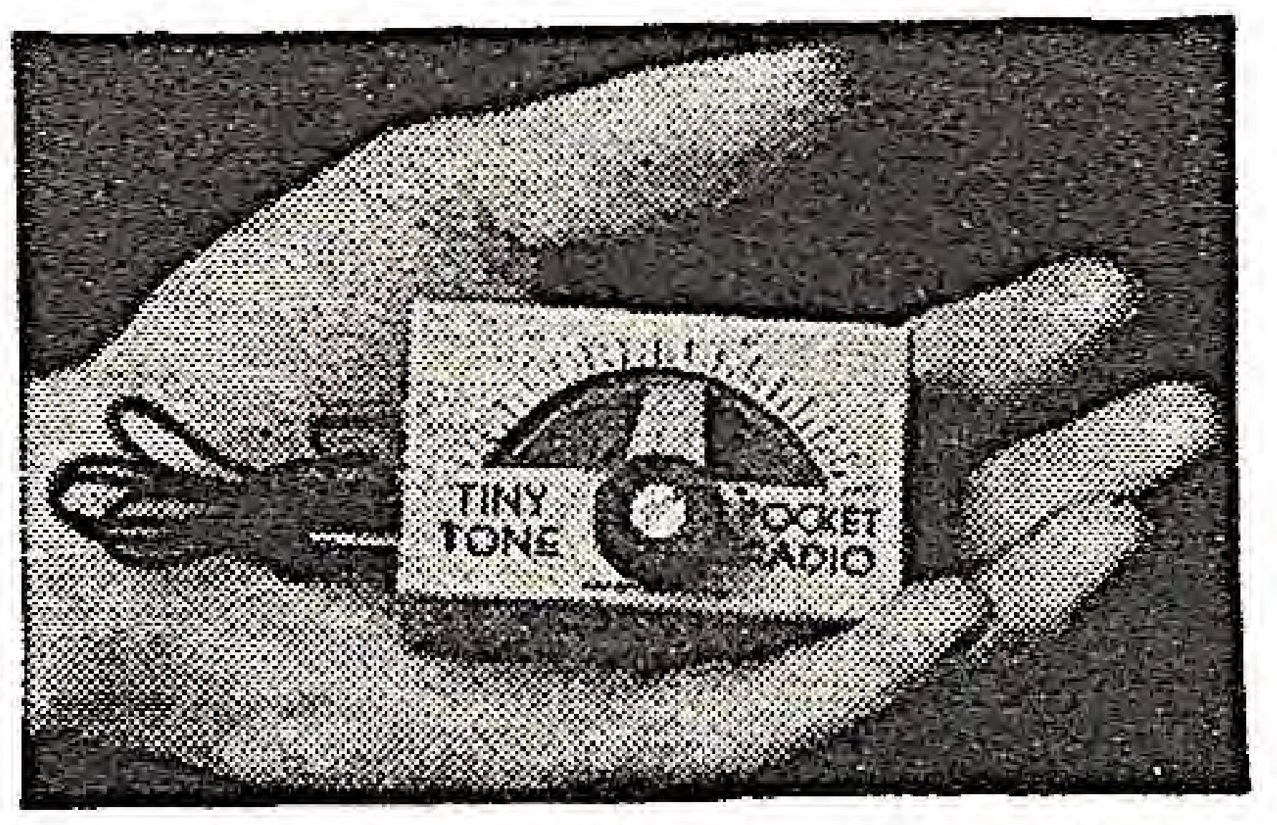

NEW!! MIDGET POCKET RADIO

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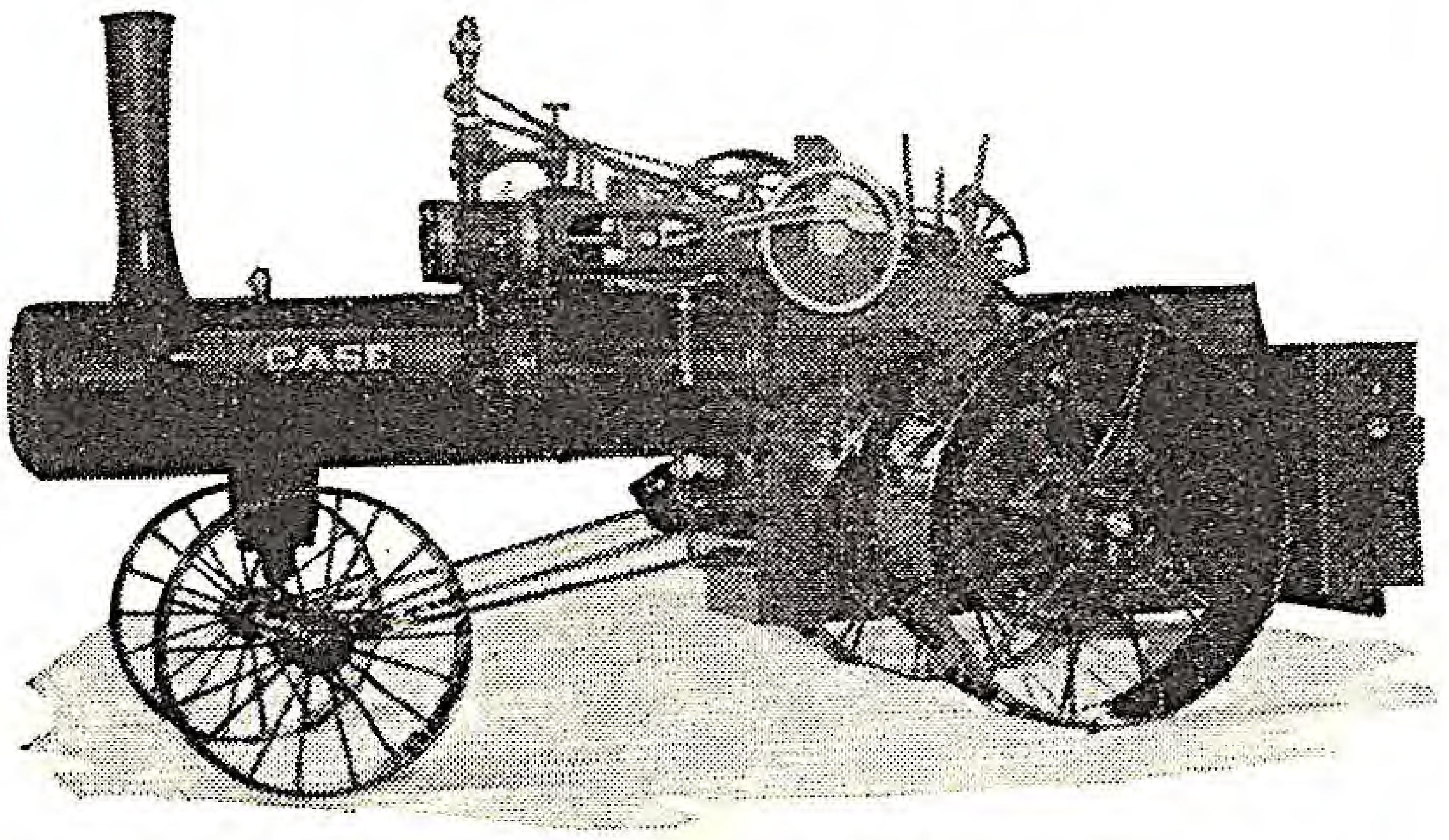
Fits in any small pocket easily. Weighs only 4 ozs. as shown. Comes in four beautiful colors (Black, Green, Brown, White). NO tubes, batteries, or electrical connections needed! Nothing to wear or need replacement—will last for years—only one moving part! Separates and receives broadcast stations with beautiful clear tone. Range up to 50 miles—MUCH GREATER under good conditions—very little static or interference! Can be used by ANYONE ANYWHERE! NO CRYSTALS TO ADJUST! Absolutely complete with midget phone and instructions to use while in bed, hotels, at home, autos, offices, camps, on bicycles or any place you may be. No complicated or messy hookups—takes only a second to connect! THOUSANDS OF SATISFIED OWNERS. THESE ARE FACTS. Send only $1.00 and pay postman $1.99 plus postage on arrival or send $2.99 (Cash, Money Order, Check). Ideal Gift. Guaranteed. State Color. ORDER NOW! (Foreign orders 65c extra.)

TINYTONE RADIO CO., Dept. M-6, KEARNEY, NEBRASKA

Chips from the Editor's Workbench

[*Continued from page 23*]



This model tractor was made without the assistance of blueprints by Clarence Eltz of Juniata, Neb. He worked from photos, a few dimensions and a general knowledge of models.

MAGAZINE. I am very well pleased with the results. I did not have a lathe when I first began work on the model and so was forced to improvise. For instance the air tanks and reversing cylinder are built up from sheet brass, the steam inlet pipes are .22 cal. rifle shells, and the steam dome, etc., were hammered out of sheet brass.

After acquiring a lathe, there wasn't much left in the exchequer for other purposes so the drive wheels were built up of brass sheet, soldered, and smoothed up on the lathe.

Irving Streng.

***

Here is a letter that is self-explanatory.

Boston, Mass.

Dear Editor:

In one of your recent issues I was interested in the opportunity you offered to inventors to join the International Society of Inventors, and I am writing this letter as a result of that interest and to offer a suggestion for the financial betterment of the inventors who belong to the Society.

The suggestion I have in mind is this: Inasmuch as inventors working alone, trying to market their ideas run into all sorts of ideas, not the least of which is lack of sufficient money, why can't a co-operative organization be formed with the same purpose in mind as the farmer's and dairymen's groups?

This Inventors group would be self-supporting after the initial fees to get it organized.

The personnel of the organization would be composed of men of reputable character and with a wide knowledge of the business and industrial world. Because of their contacts with the business world, they could accomplish more and secure better terms than could an individual working alone.

Members of the International Society of Inventors could submit ideas without charge, suitable terms later being arranged if the idea or invention was sold.

I know if an organization of this kind had been in existence before, many inventors would be money ahead.

Charles F. Barbour.

***

What do you inventors think of that idea?

***

And now just one more reminder. Turn to page 46 and get in on the Automobile Identification Contest with its $1,000.00 in cash prizes.

MOTOR OIL
"WOULD YOU PAY
5¢ a gallon
FOR THIS OIL?"

TWO WEEKS AGO this black, tarry-looking substance, that you wouldn't buy at any price, was a fine high grade oil . . . taken out of a sealed can and put in the completely drained crankcase of an engine that was not protected by an oil filter. Today, this once fine oil has already begun to develope sludge . . . and to accumulate the dirt and grit and hard carbon that always find their way into an engine. These harsh, destructive substances are sources of costly replacements and repairs . . . for they are carried by the oil stream into closely fitted moving parts, where they grind away at valves and cylinder walls and bearings.

If you are driving one of the many millions of cars that were protected with a Purolator Oil Filter at the factory, your oil will continue to be a fine, clean, effective lubricant, and will even retain its color after thousands of miles of driving. There are just two things to remember. First,

YOUR PUROLATOR MUST BE RESERVICED AFTER ABOUT 8000 MILES

That is because its reservoir has become so full of the destructive sludge it has removed that it will hold no more. Second,

Be Sure You Get a Genuine Purolator Refill

That is because it is the overwhelming choice of automotive engineers . . . as is attested by the fact that 91% of all filter-equipped cars during 1935 left the factory carrying GENUINE Purolators.

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The Oil Filter on Your Motor Car

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We want to personally interview, at our own expense, a number of ambitious men—aged 21 to 40—in various localities. We will select as many as possible to qualify for positions in America's two fastest-growing Industries. The men we select will be trained for installing and servicing all kinds of domestic and commercial Air Conditioning and Electric Refrigeration equipment. Do not reply unless you are mechanically inclined, have fair education and are employed at present at least part time. Character references required. You must be willing to study during spare time for few months at some cost to you. Write giving full details of age, education and present occupation.

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EVERYBODY at some time or other hits upon an idea for a new novelty, gadget, improvement upon other products, formula or some scheme. Don't lay it aside. Sometimes the simplest idea makes the most money. Let me help you. I've had 12 years' experience in helping others sell millions of dollars worth of products. Write me at once for full information on how I help people who want to turn their ideas into money. Send 25 cents to cover costs. Arthur Richard, 3337 Brantford, Toledo, Ohio.

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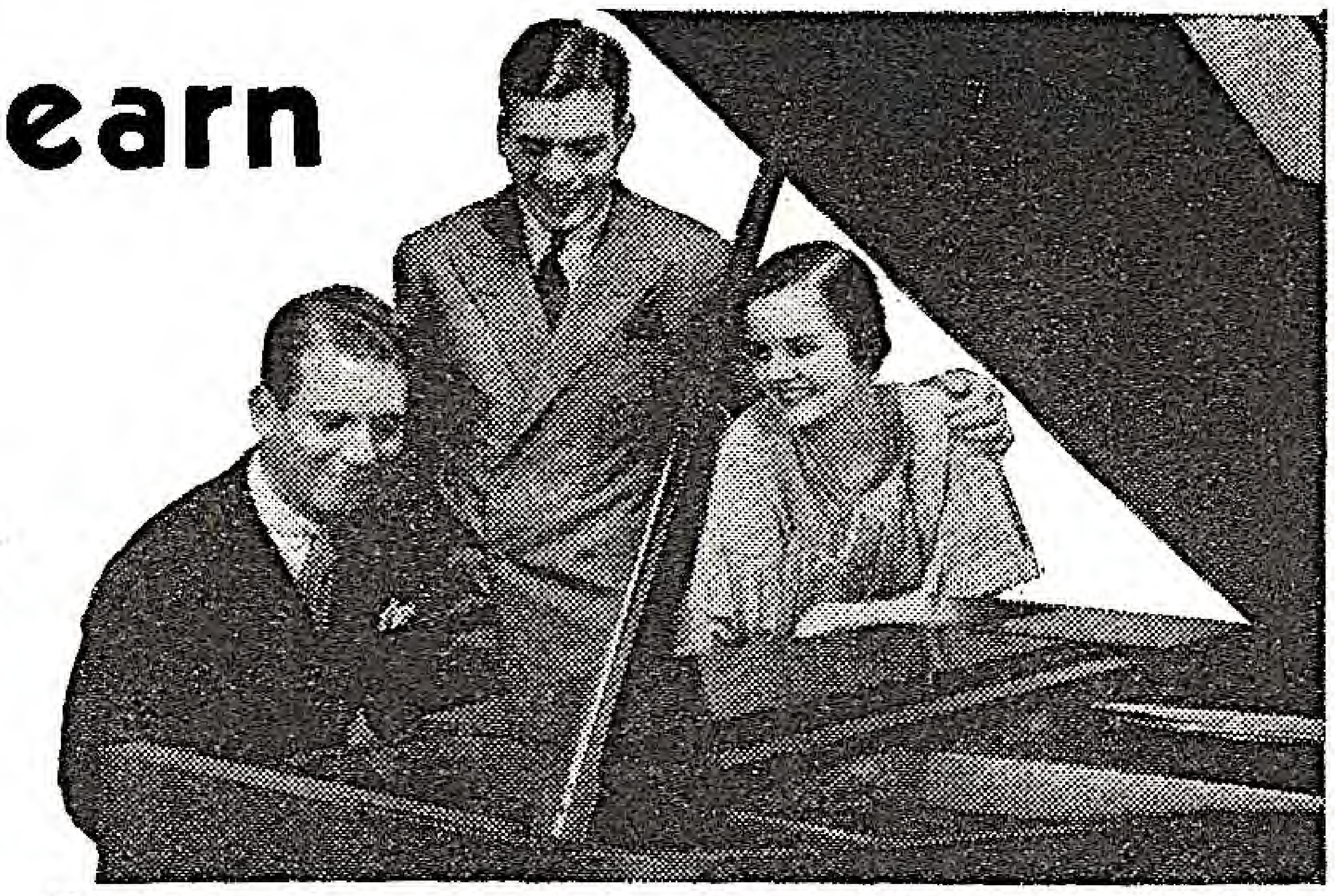

You've noticed that the most popular men and women are those who can entertain. They know how to keep the party going—keep people happy and amused. And what better entertainment is there than music? Everyone welcomes the person who can play. He or she is always the center of attraction.

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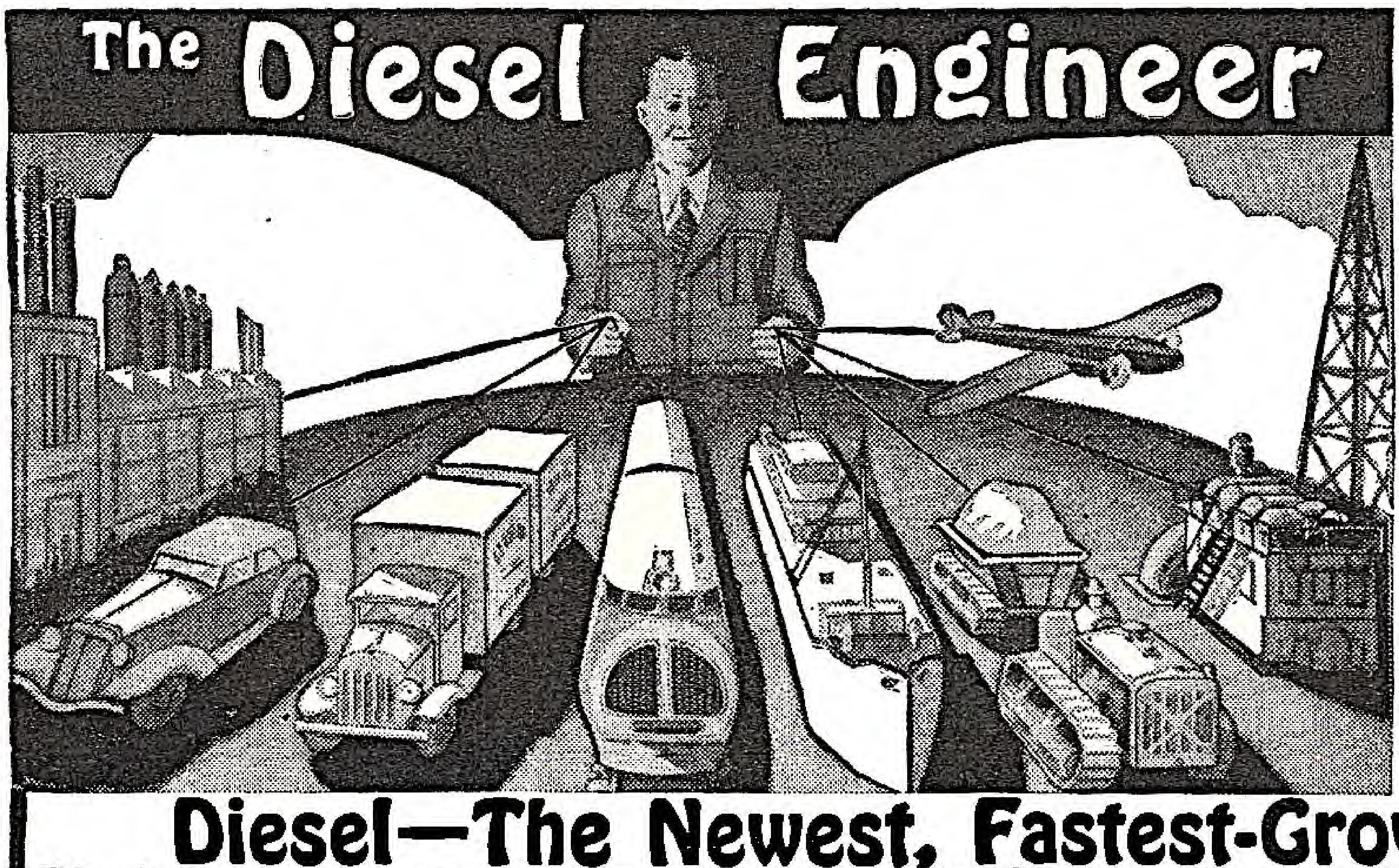
Instrument .... Have you Instrument?......



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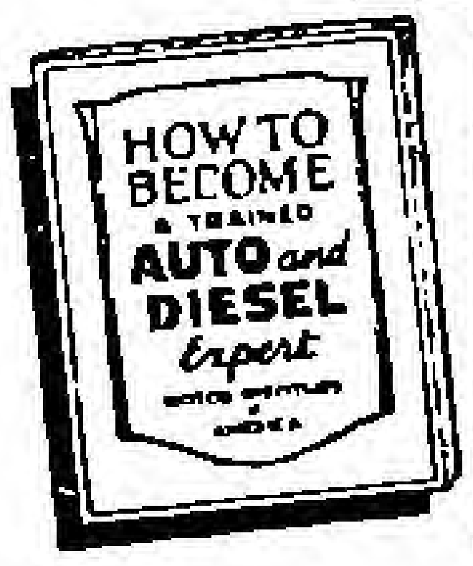
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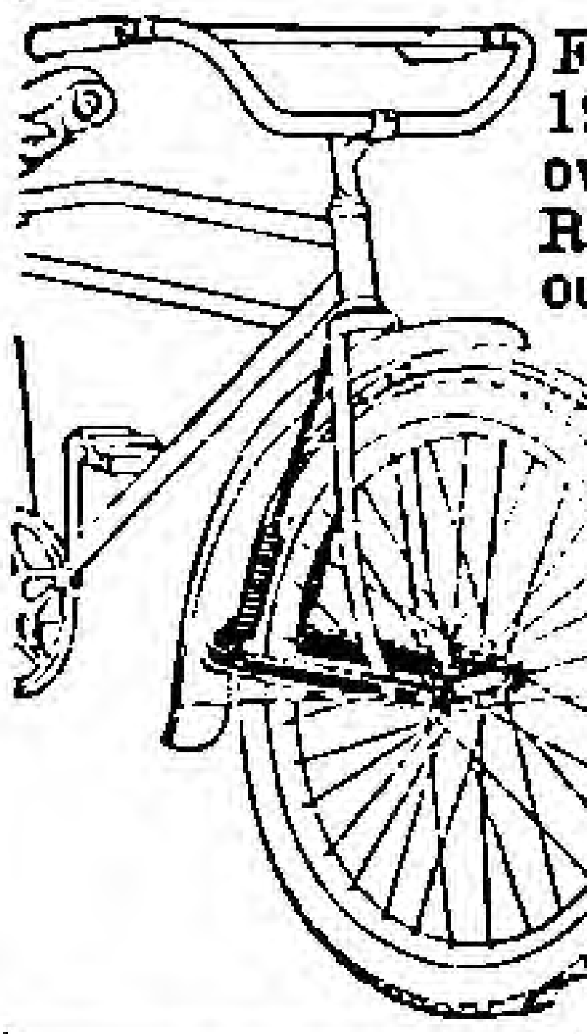

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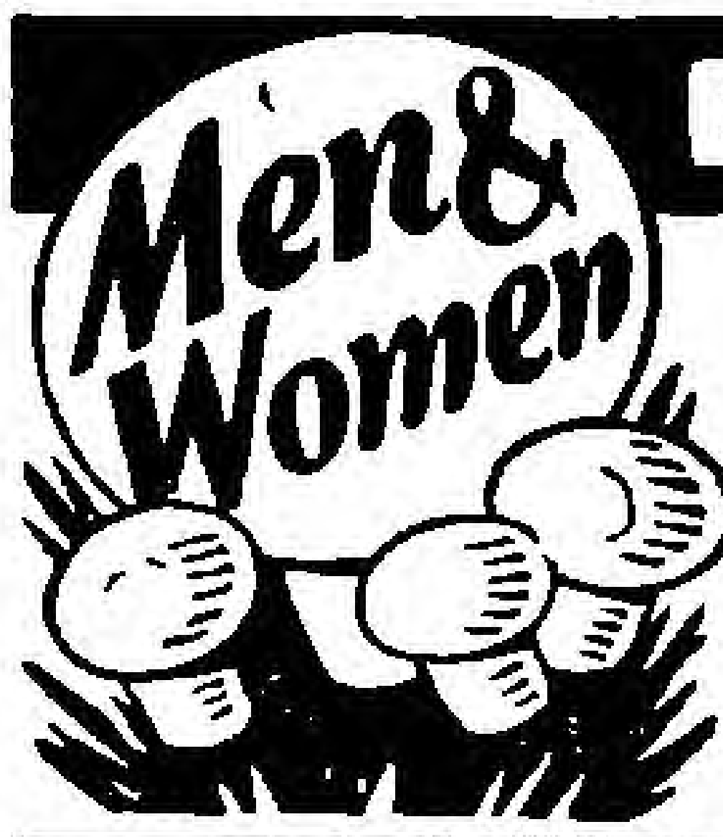

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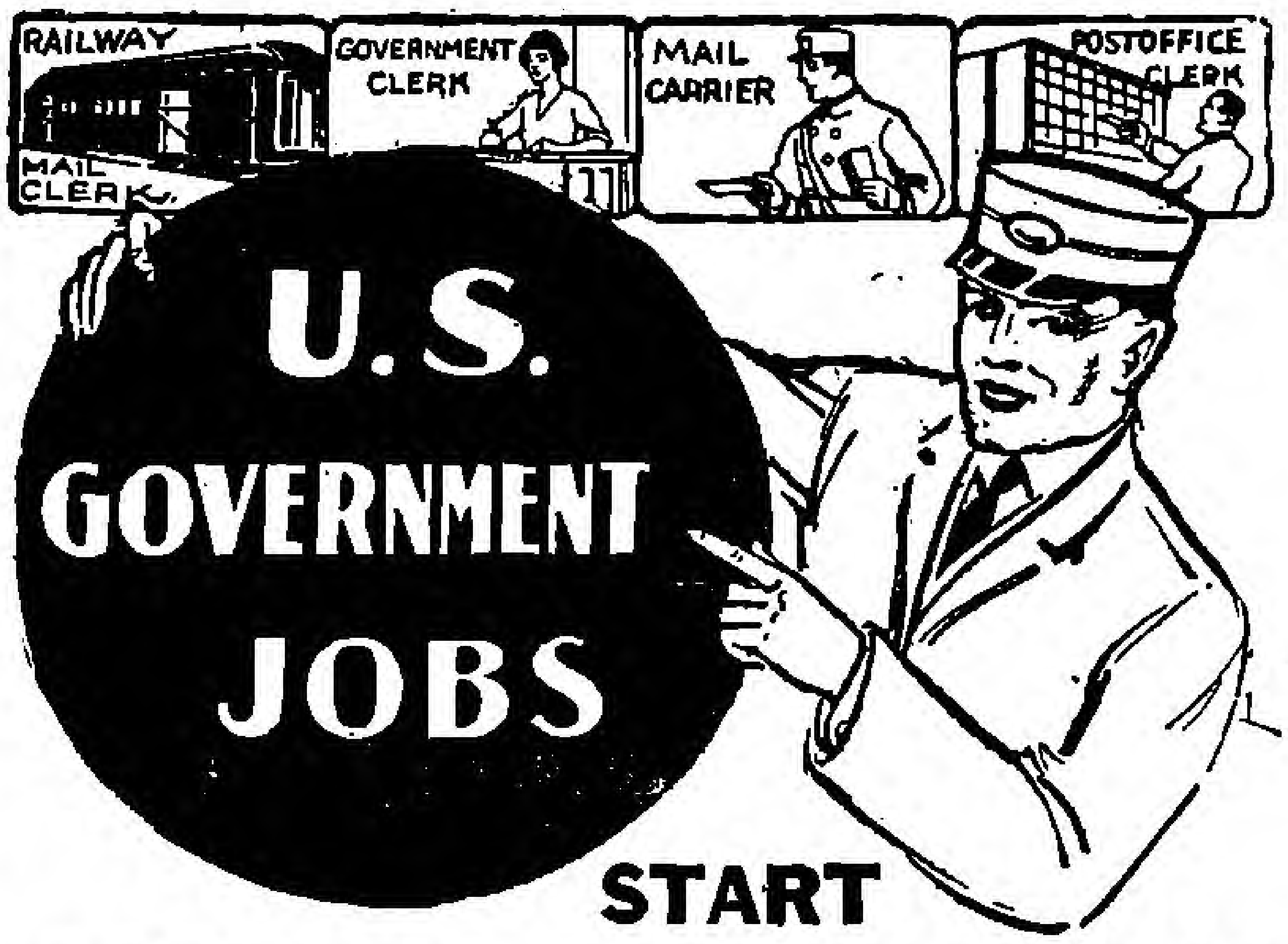

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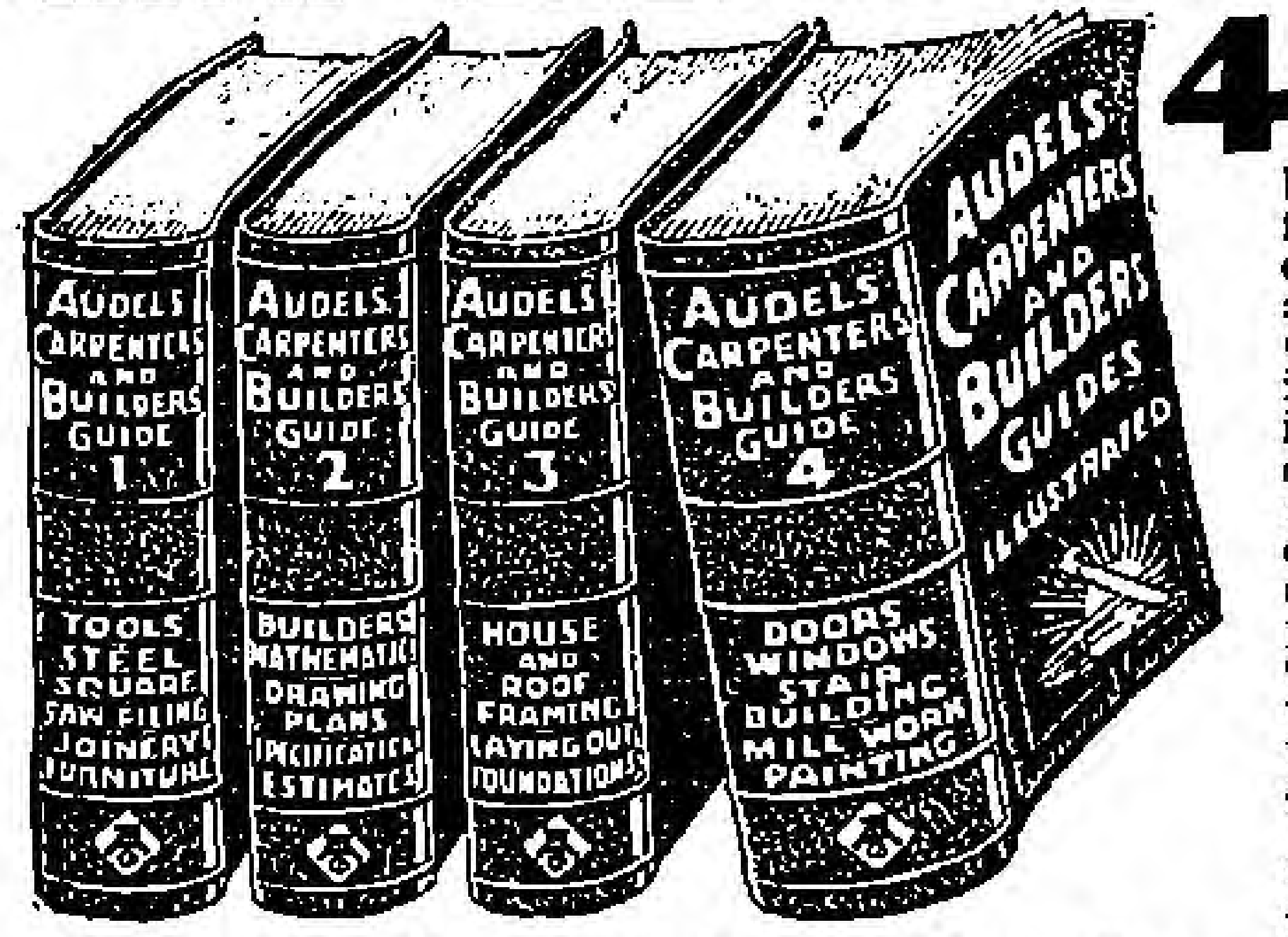
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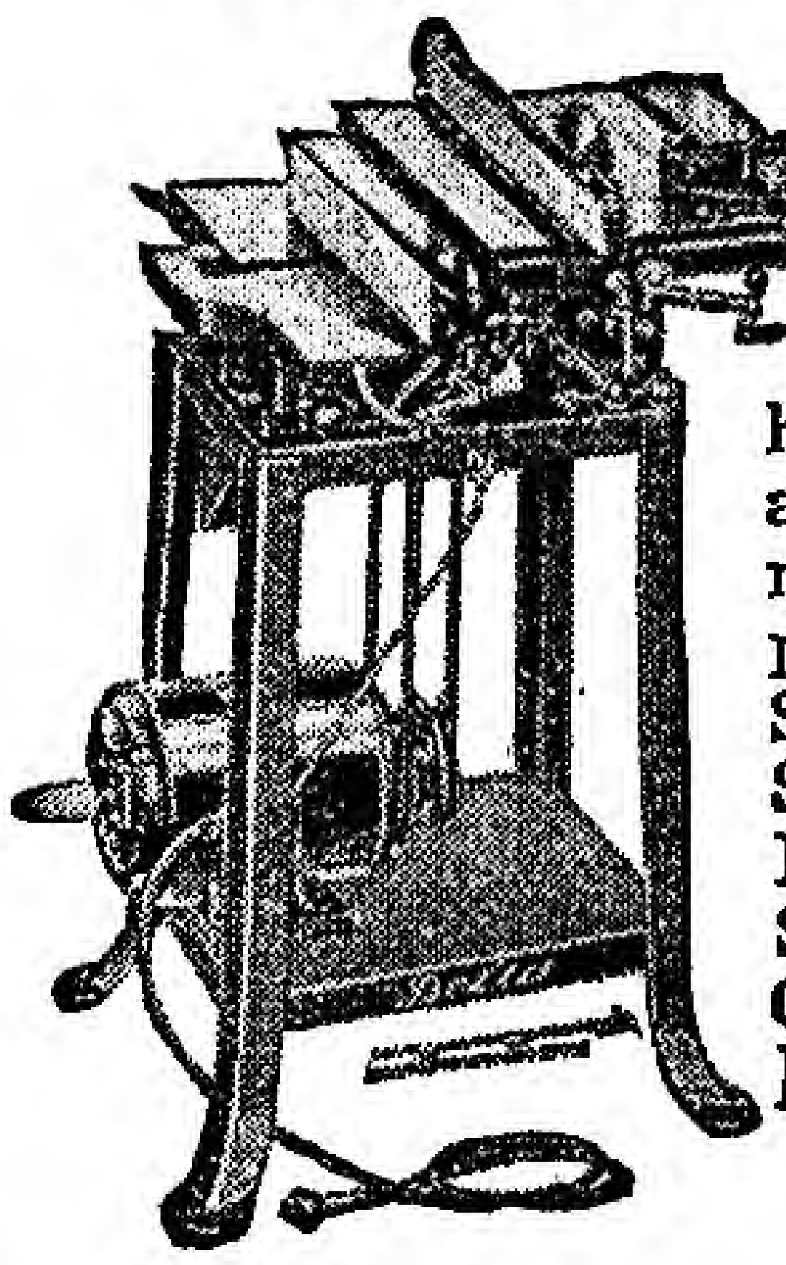

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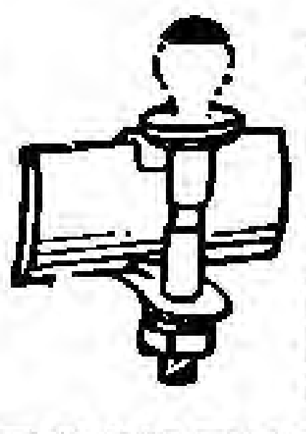

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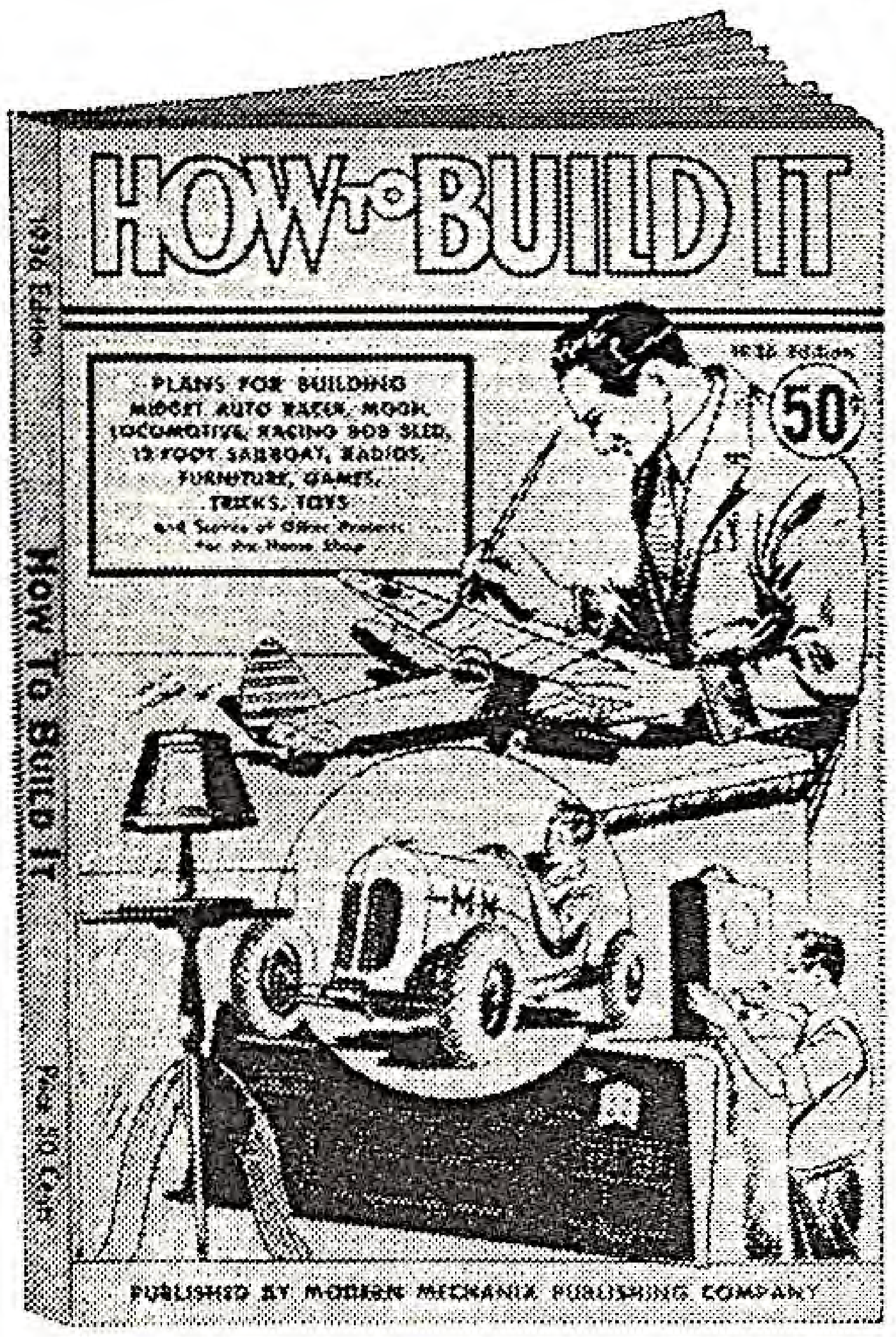
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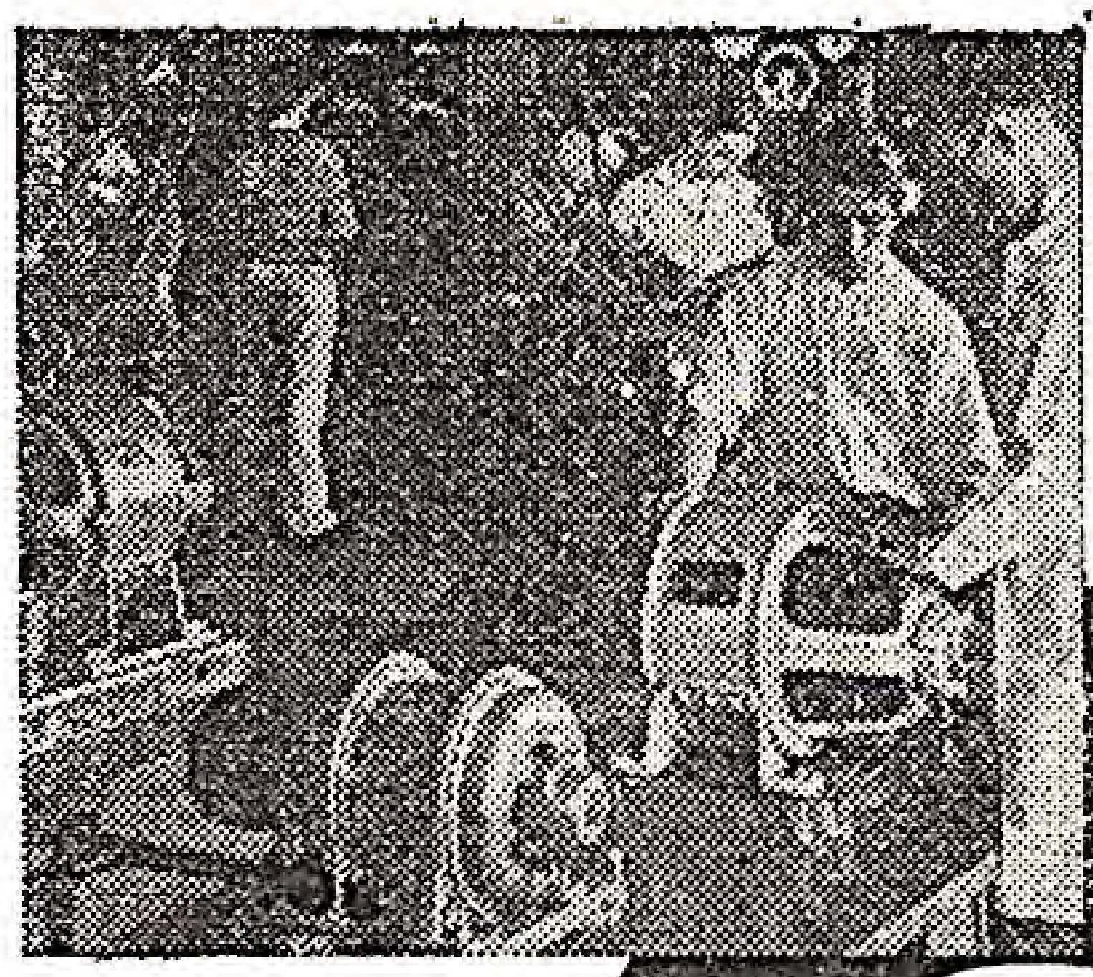

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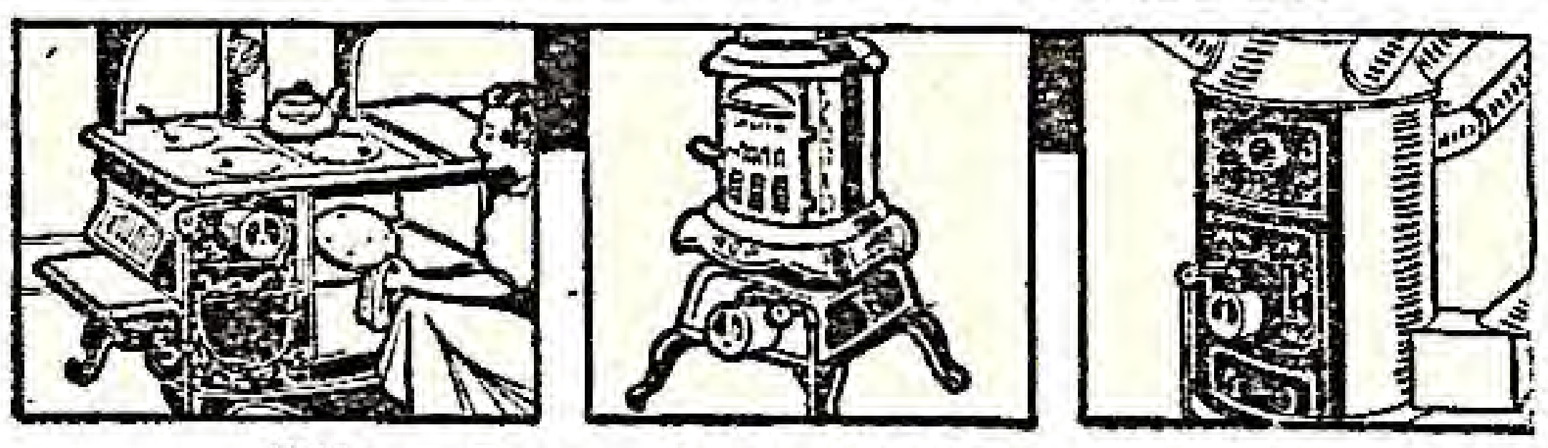

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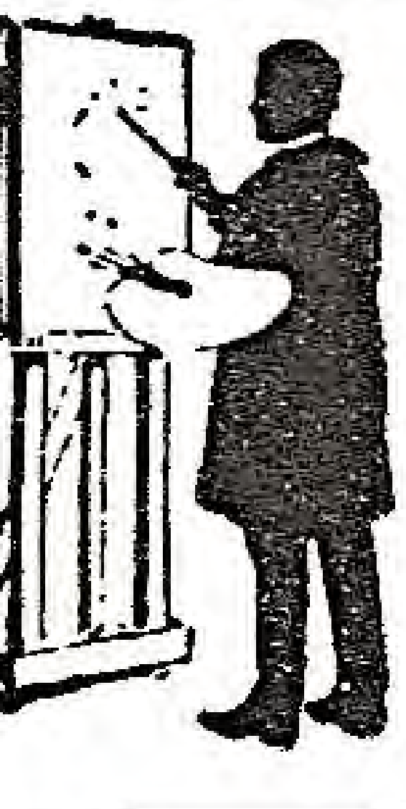

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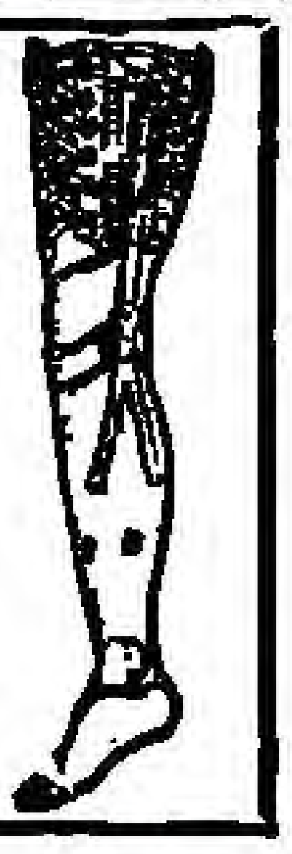

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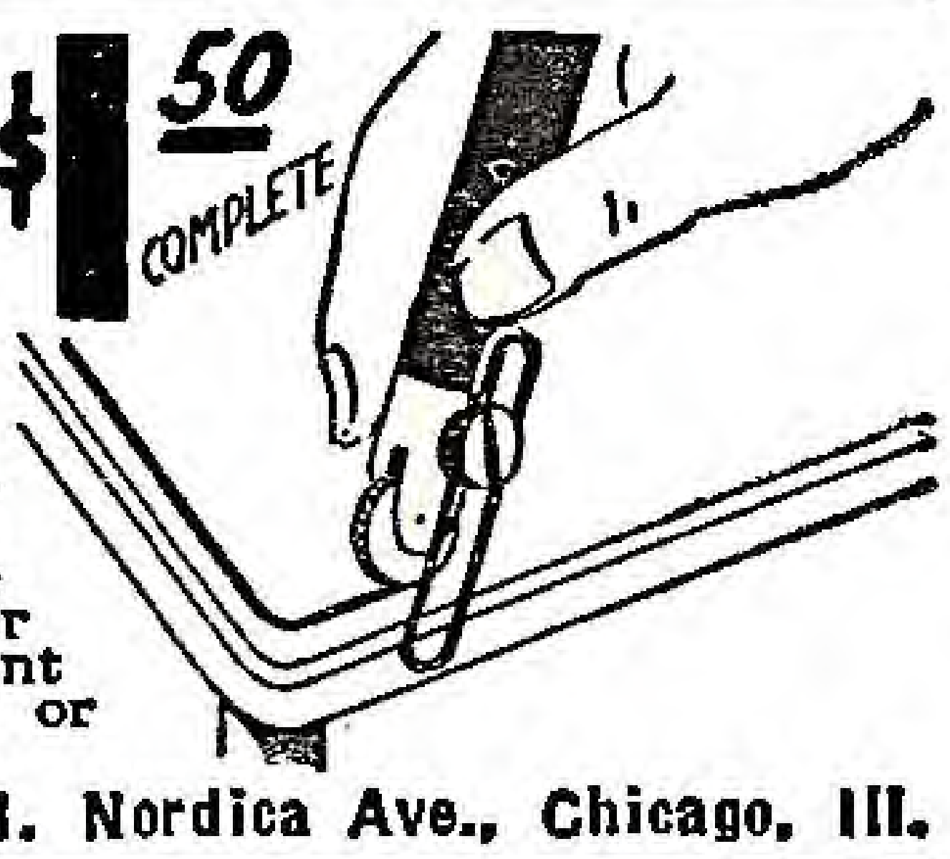

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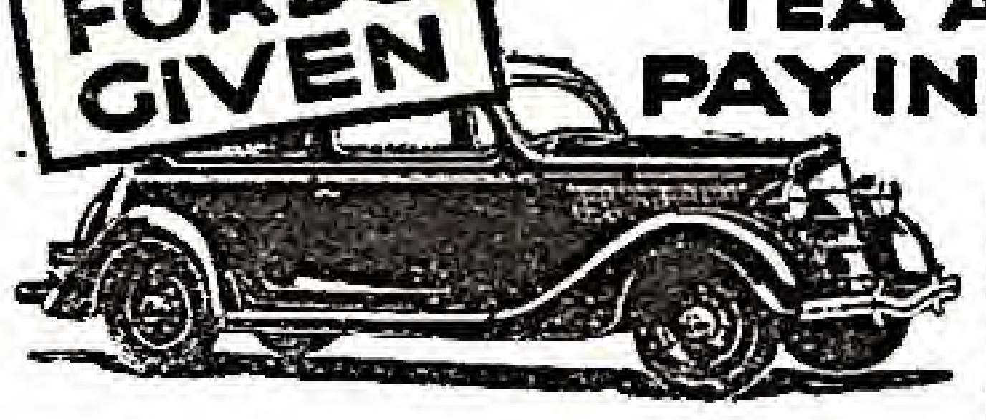

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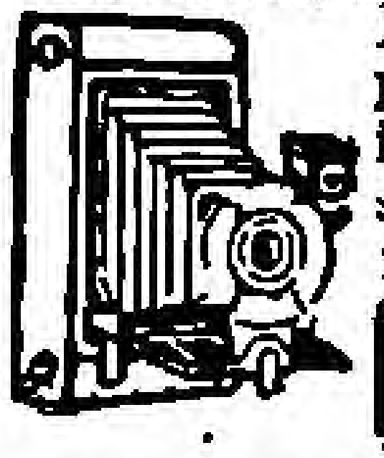

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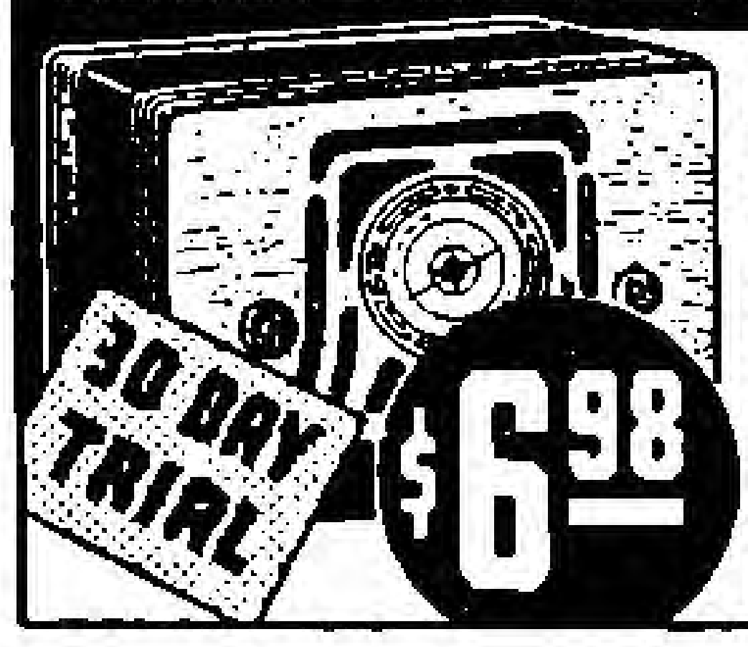

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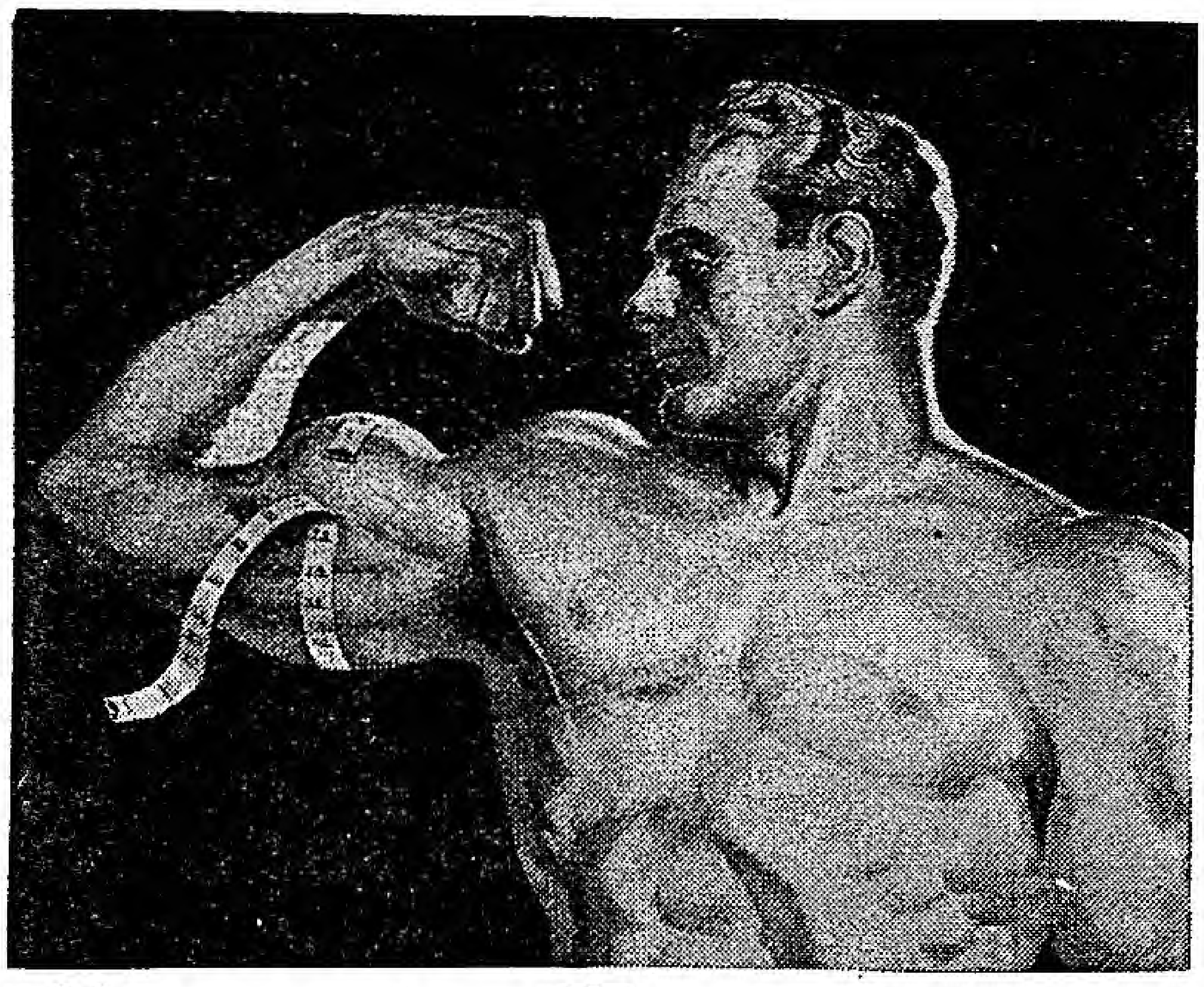

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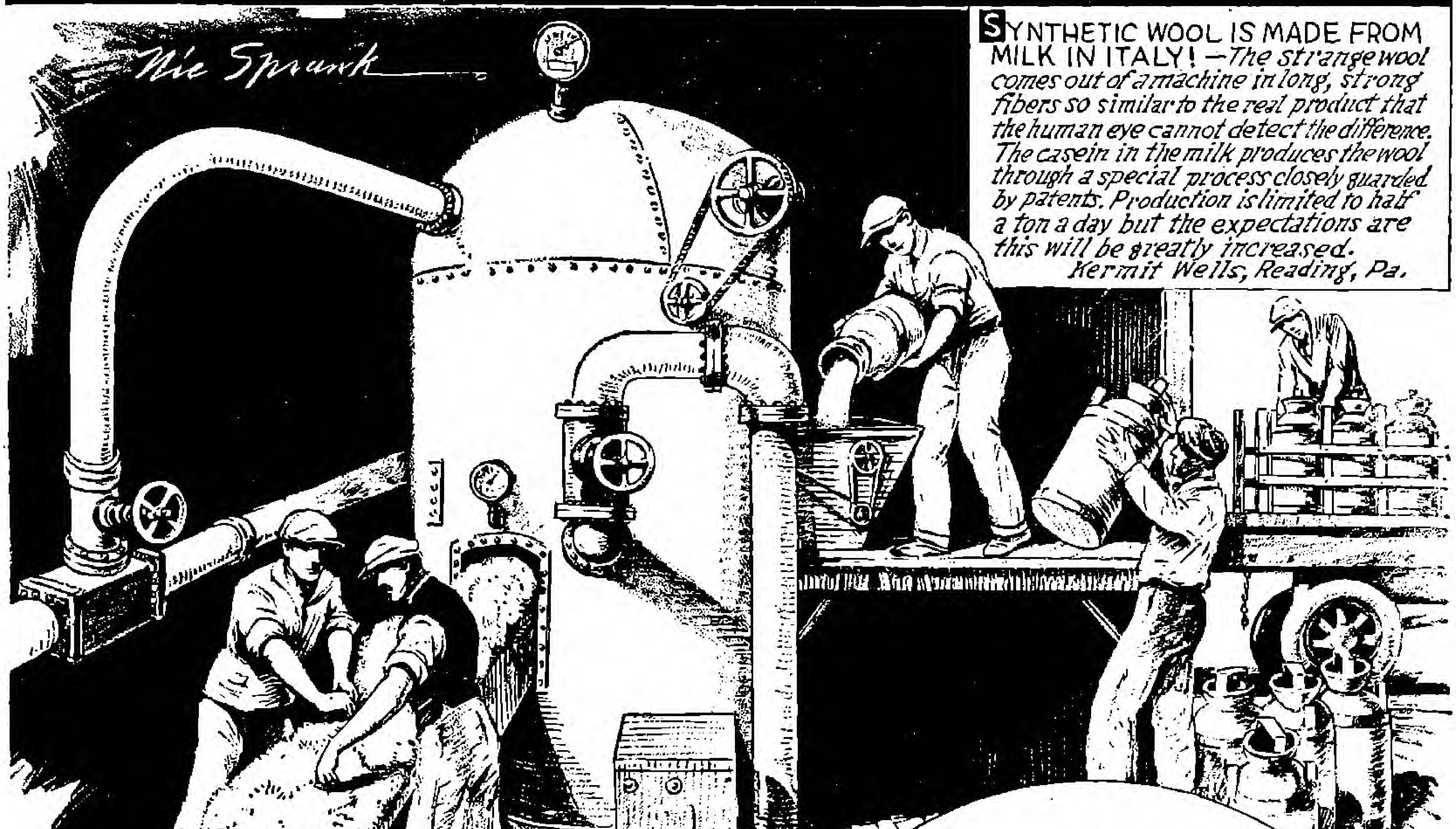

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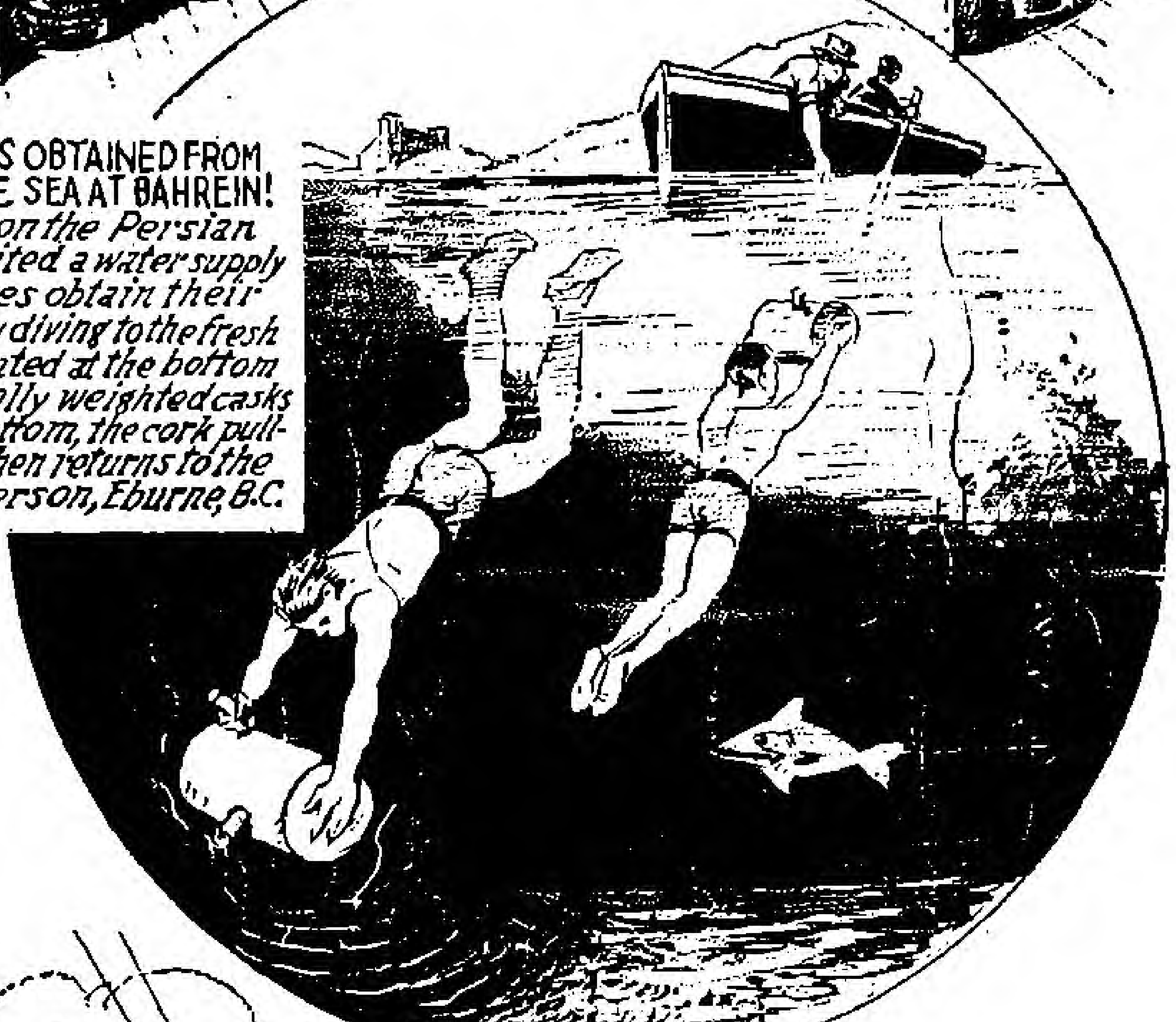

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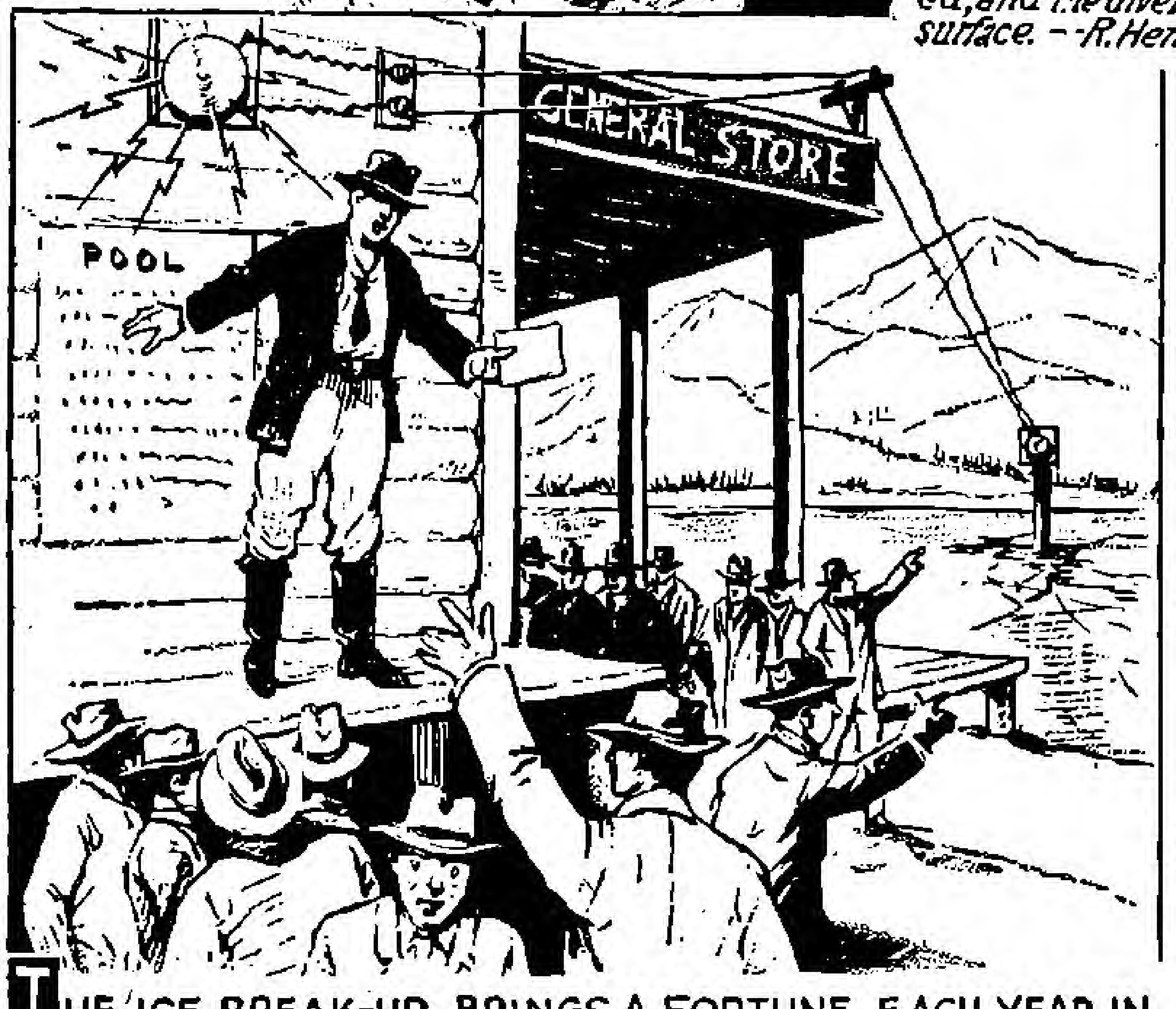
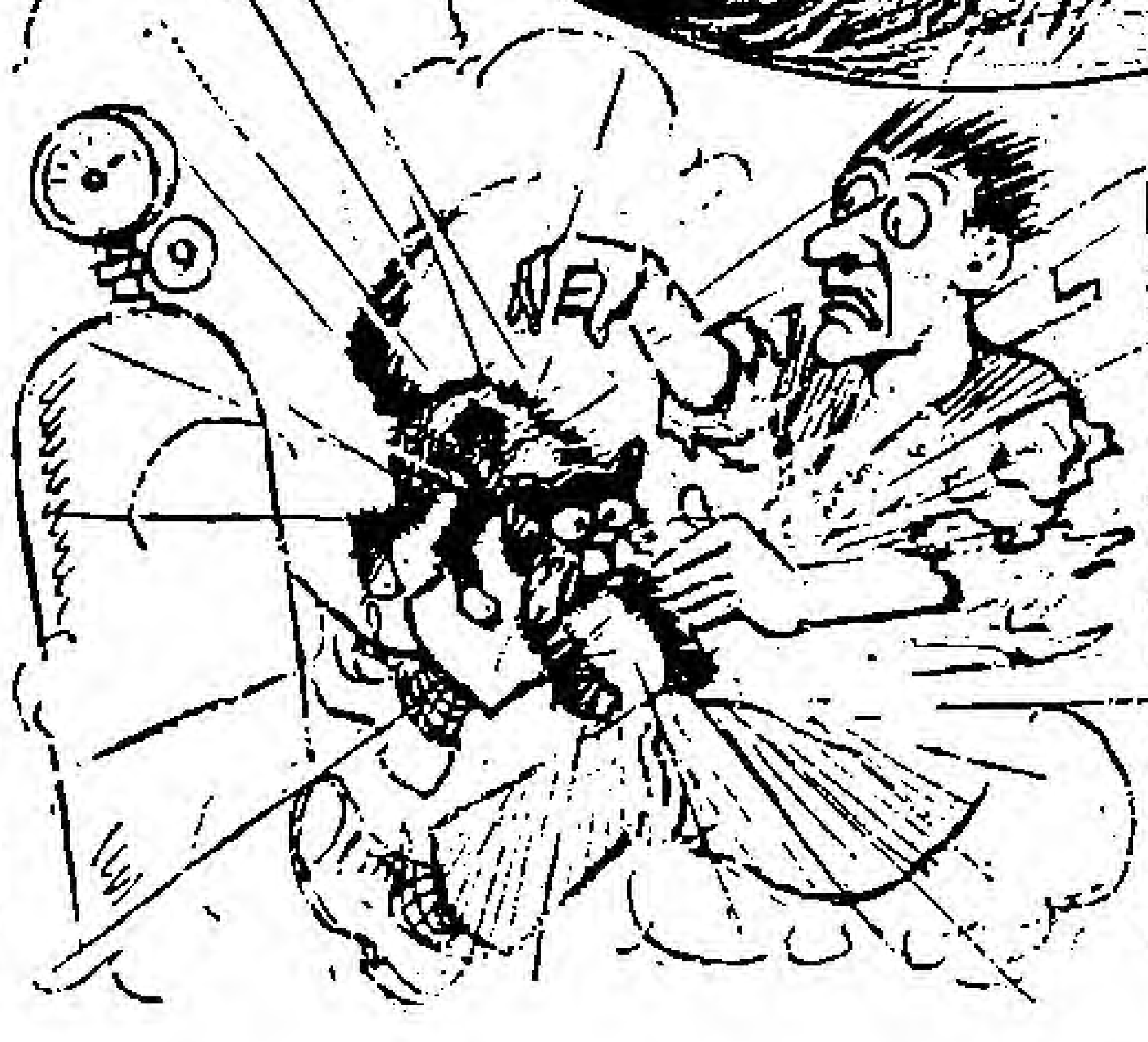


THE ICE BREAK-UP BRINGS A FORTUNE EACH YEAR IN ALASKA! —*All Alaska joins in guessing the exact minute when the ice will start breaking up in the Nenana River near Fairbanks. Last year the winner of the contest, who guessed the time to the minute, received $61,600. Electric wires attached to a clock frozen in the ice ring a bell and stop the clock the moment the ice starts to move.*
Raymond Gilman, St. Louis, Mo.



A CAT RUBBED THE WRONG WAY BLEW UP A ROOM! —*At Hamilton, Ont., a cat objected to being thrust into a gas-filled lethal chamber at the cat and dog pound. She wriggled vigorously, creating static electricity in her fur. There was a spark, the gas exploded, and the clothes were blown off her would-be executioner. The cat never returned.*—
Herman Fleming, Dallas, Texas.

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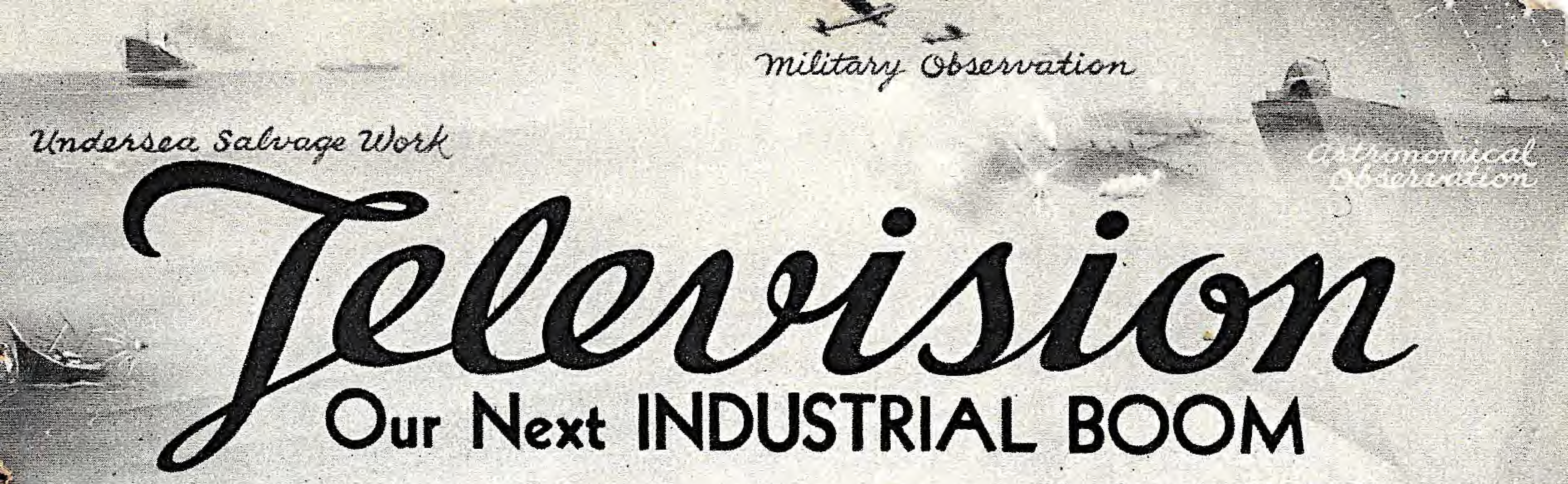
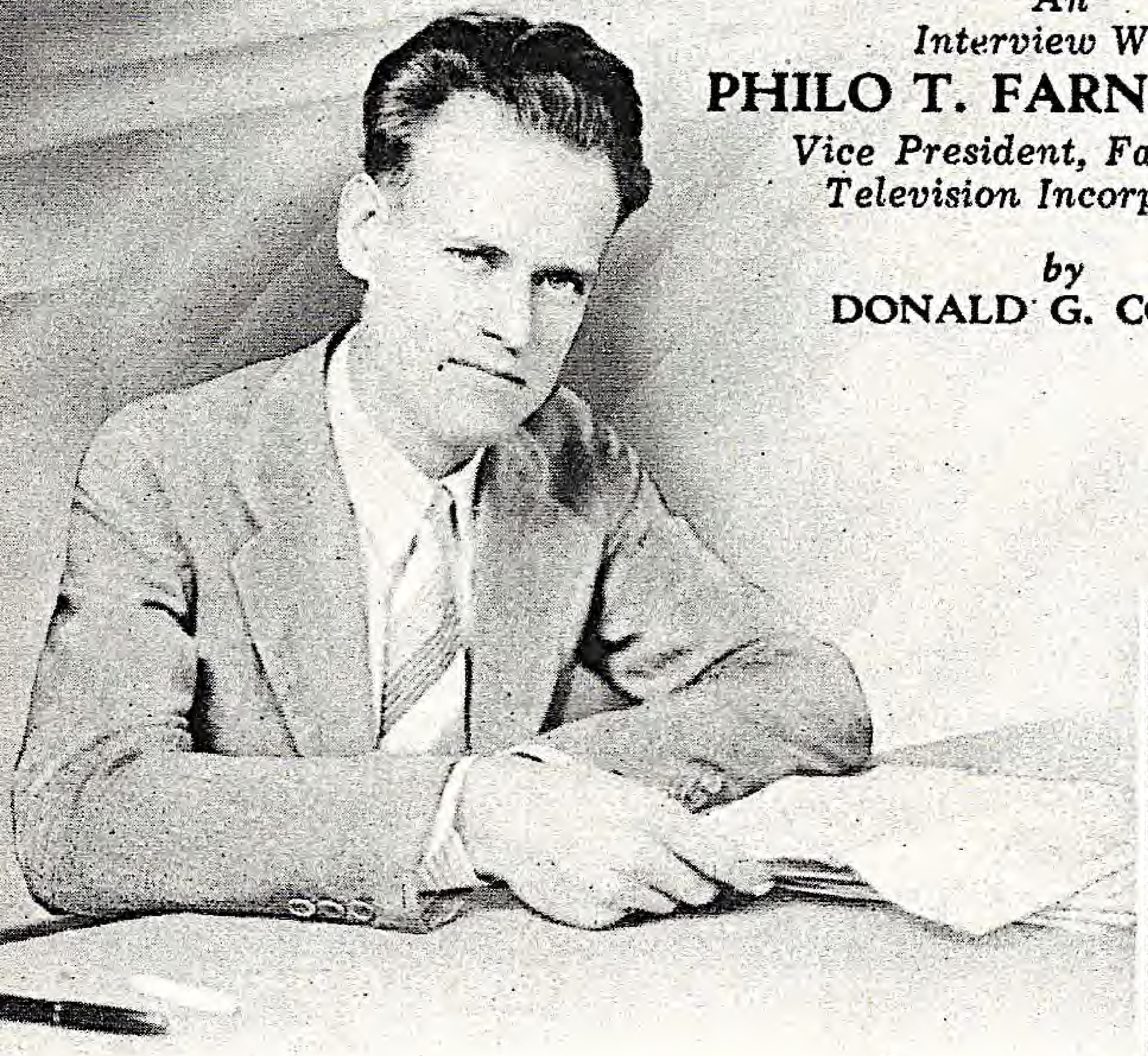


Television
Our Next INDUSTRIAL BOOM

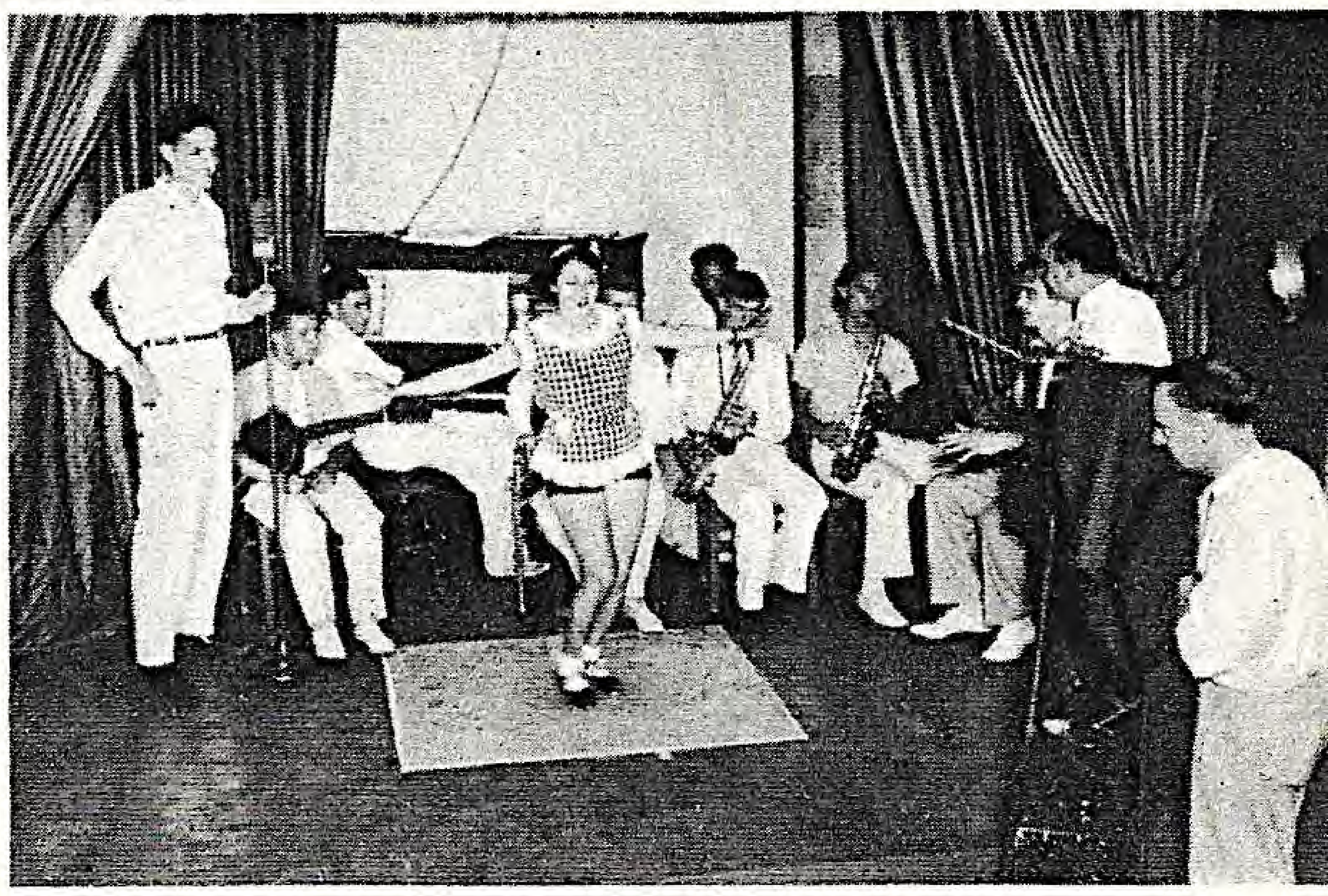
An
Interview With
PHILO T. FARNSWORTH
Vice President, Farnsworth
Television Incorporated.

by
DONALD G. COOLEY

In the television laboratories a new industrial giant awaits the signal to step forth, bringing new miracles in science.



Probably the foremost authority on television in the world is youthful Philo T. Farnsworth, above. To him must go credit for much of the phenomenal development in television today.



A scene in a television studio. Already such scenes are being broadcast for short distances, but for experimental purposes only. When time comes, and it will come soon, these scenes will burst forth in all their glory from your receiving set.

"NINETEEN hundred and thirty-six will be the year of the big television explosion!"

You have the word of Philo T. Farnsworth for that—and as the founder of Farnsworth Television, Incorporated, as a pioneer television experimenter, and holder of basic patents on electronic image scanning which will be the basis of commercial television, the prediction comes from the one man best qualified to make it.

The impending "explosion" is the eruption of television out of the laboratory into commercial refinement.

Out of it will almost inevitably come a tremendous boom in the radio and electrical and motion picture industries—a boom even more far-reaching than the fabulous one of the Twenties when radio suddenly grew up. Television may very well be the weapon which will finally rout the depression. This is revolutionary enough, but even more startling are some of the applications Mr. Farnsworth sees for this new-born giant among industries.

For television, when it comes, will be no infant feebly feeling its way. Rather, it will be a lusty Goliath which will upset military science as drastically as did the airplane a generation ago, which will vitally affect the lives of every one of us, and perform breath-taking miracles when it is put to *work* in other fields than that of entertainment.

Television has been "just around the corner" for so many years that I went directly to Mr. Farnsworth to find out for readers of MODERN MECHANIX AND INVENTIONS MAGAZINE

Television To Reach Public in Perfected State

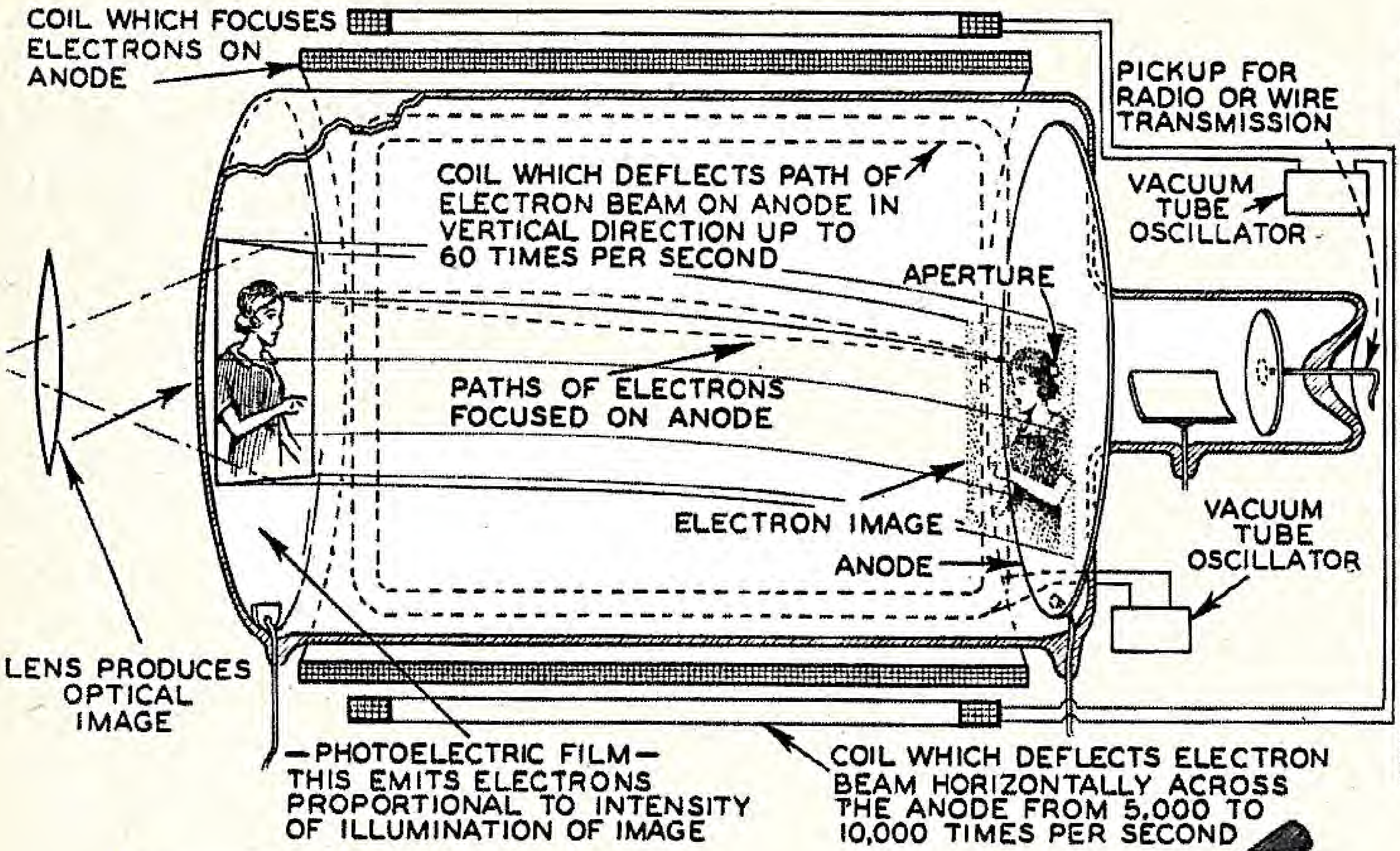
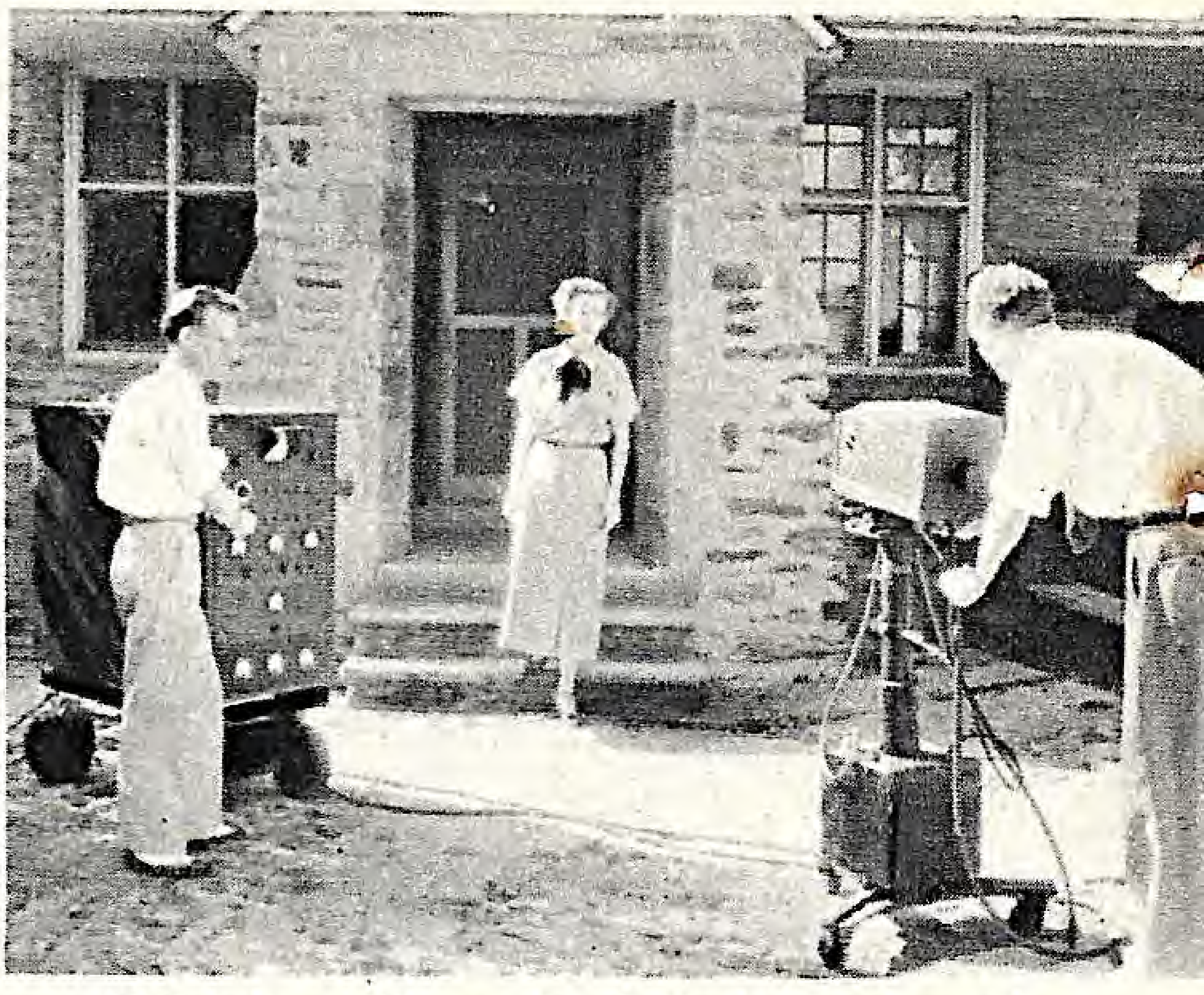
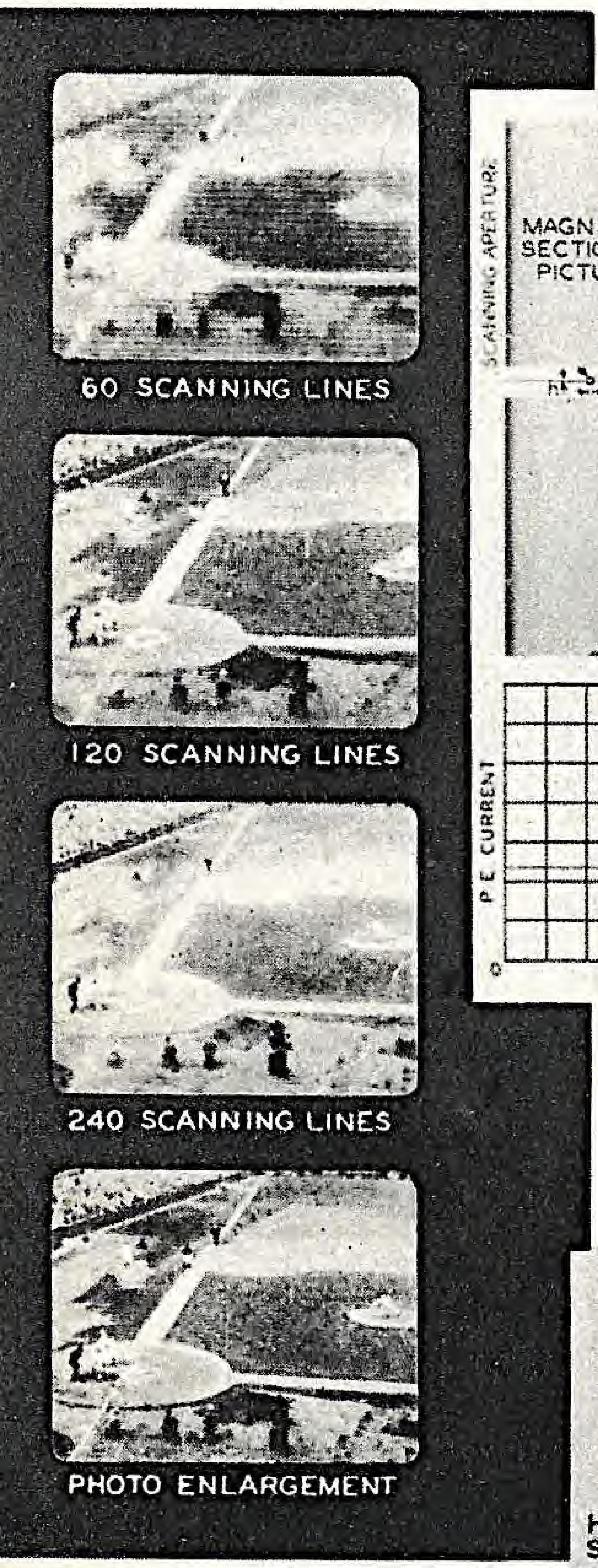

COIL WHICH FOCUSES ELECTRONS ON ANODE
PICKUP FOR RADIO OR WIRE TRANSMISSION
COIL WHICH DEFLECTS PATH OF ELECTRON BEAM ON ANODE IN VERTICAL DIRECTION UP TO 60 TIMES PER SECOND
VACUUM TUBE OSCILLATOR
APERTURE
PATHS OF ELECTRONS FOCUSED ON ANODE
ELECTRON IMAGE
ANODE
VACUUM TUBE OSCILLATOR
LENS PRODUCES OPTICAL IMAGE
—PHOTOELECTRIC FILM— THIS EMITS ELECTRONS PROPORTIONAL TO INTENSITY OF ILLUMINATION OF IMAGE
COIL WHICH DEFLECTS ELECTRON BEAM HORIZONTALLY ACROSS THE ANODE FROM 5,000 TO 10,000 TIMES PER SECOND

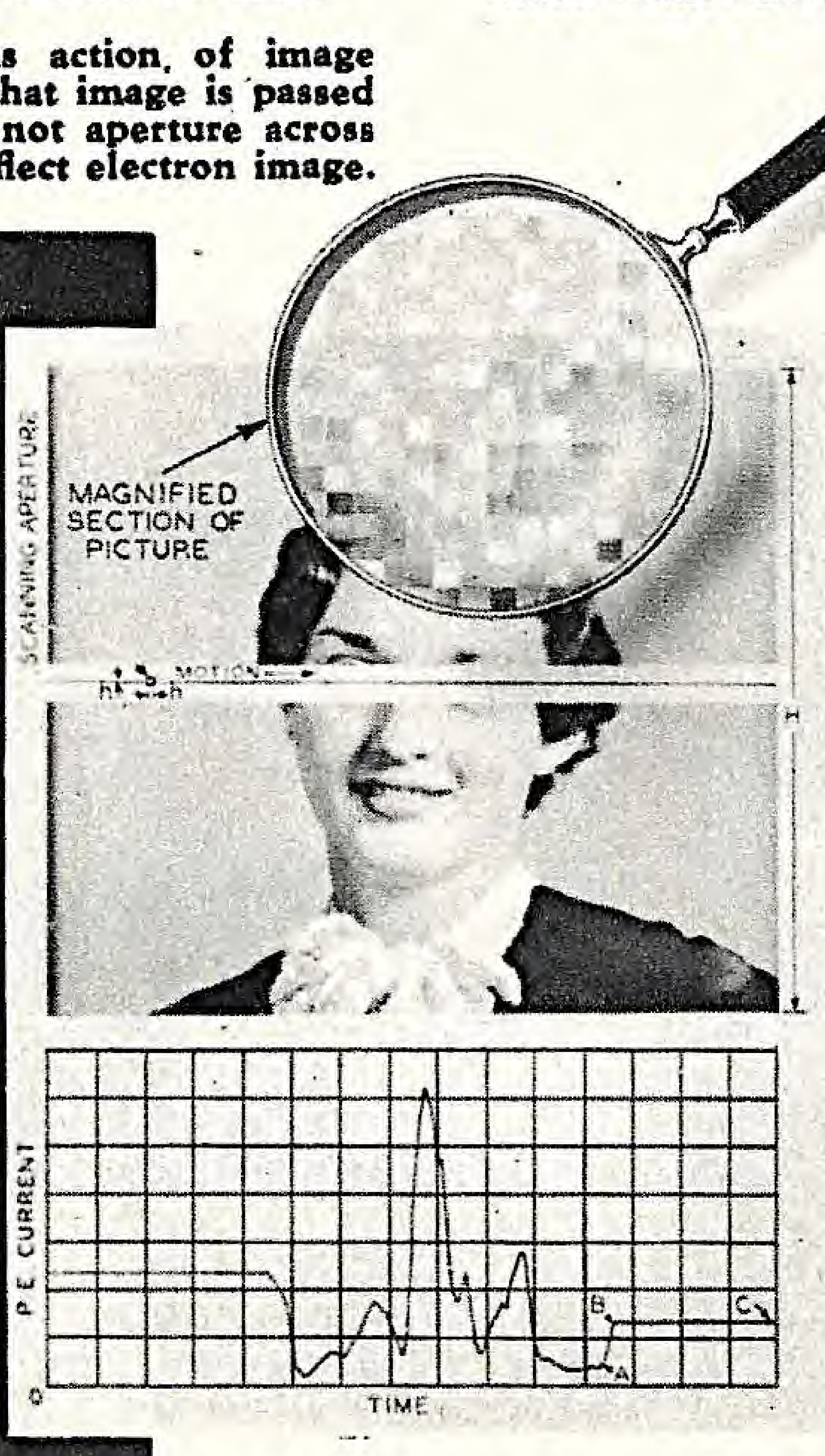
Diagram explains action of image dissector. Note that image is passed before aperture, not aperture across image. Coils deflect electron image.



Television will not be limited to the studio. Outdoor scenes such as this can be reproduced with utmost fidelity, opening up an entirely new vista in modern home entertainment.


60 SCANNING LINES
120 SCANNING LINES
240 SCANNING LINES
PHOTO ENLARGEMENT

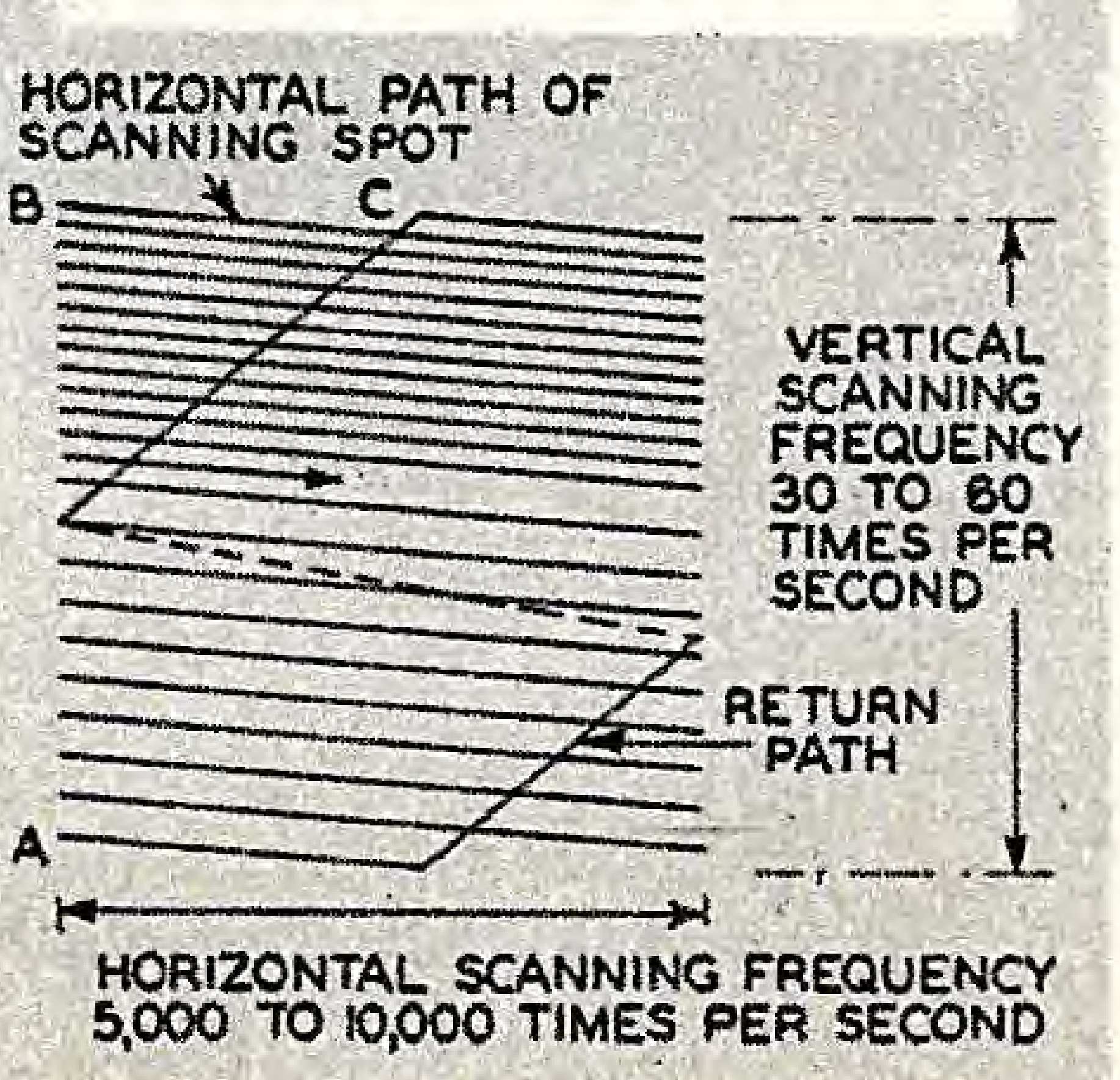
The improvements in television reception are shown above. Note the coarseness of the early 60-line scansion as contrasted with the photographic clarity of the 240 scanning lines.


MAGNIFIED SECTION OF PICTURE
SCANNING APERTURE
MOTION
P.E. CURRENT
TIME
B
C
A
0

As this image is passed before the aperture it is broken up into highlight and shadow squares. See section beneath microscope. The graph shows the light intensity across image.

INTERLACED SCANNING

This diagram shows path electron image takes in being passed before aperture in the anode.


HORIZONTAL PATH OF SCANNING SPOT
B
C
VERTICAL SCANNING FREQUENCY 30 TO 60 TIMES PER SECOND
RETURN PATH
A
HORIZONTAL SCANNING FREQUENCY 5,000 TO 10,000 TIMES PER SECOND

just when the public may expect to share in its wonders. At the Farnsworth laboratories in Philadelphia I discovered that television is a full-grown giant imprisoned within the walls of a few experimental workshops, ready for the spark that will release it.

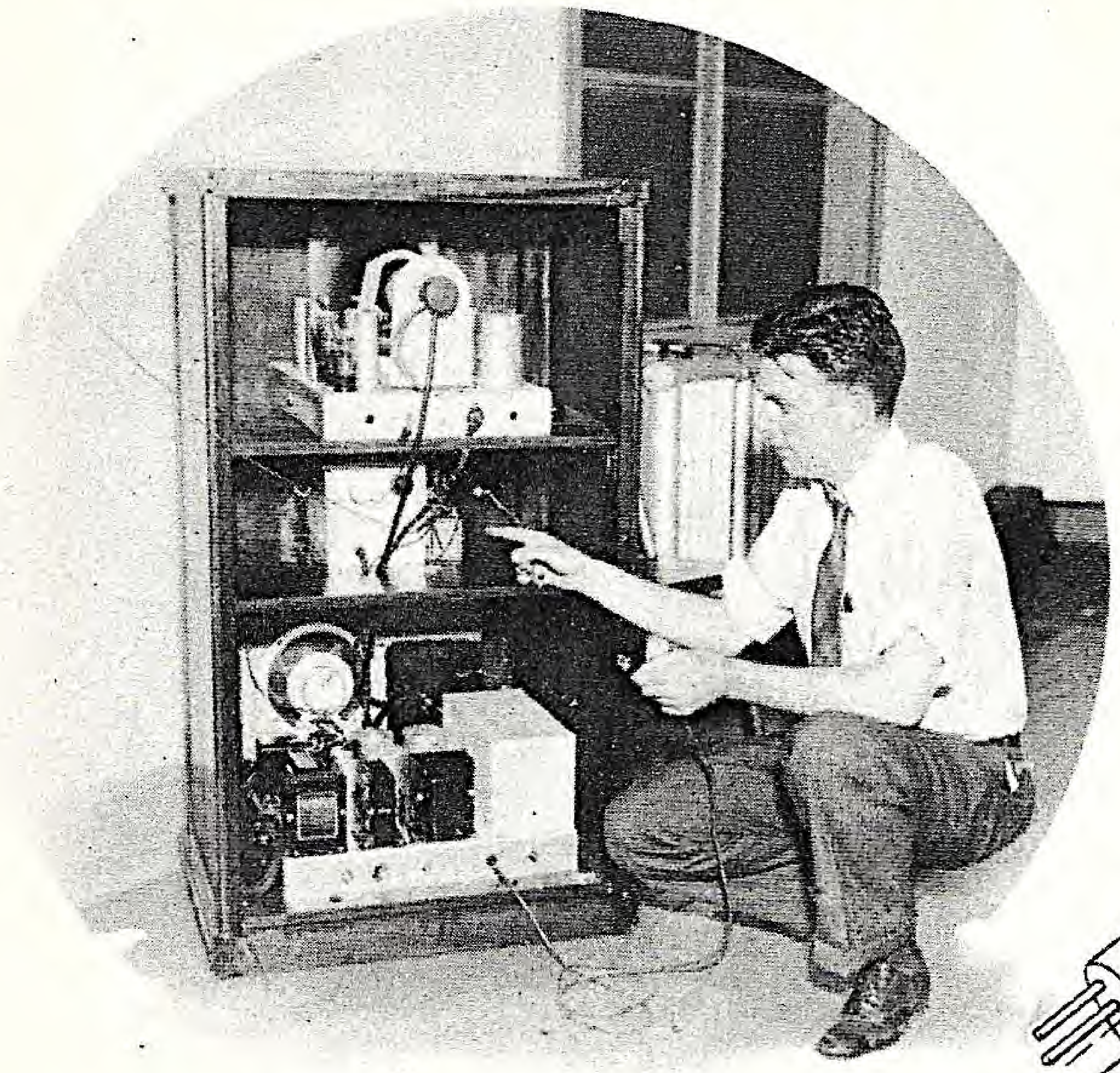
That release, Mr. Farnsworth believes, will come this year. This does not mean that you will have a television set in your home receiving programs from a nationwide network before the snow flies. Problems of standardization and transmission difficulties have built a stone wall between television and the vast public that awaits it. But the coming explosion will blast that wall to atoms.

"What is television going to do to the world when it comes?" I asked. "It's more than an instrument of entertainment. Not long ago Andrew W. Cruse of the United States Department of Commerce told electrical engineers that television could become a mechanical military spy. Transmitters could be hidden behind the lines, or suspended from airplanes flying at invisible altitudes, and flash back a living picture of the enemy's operations. As a scientist, does this application seem fantastic to you?"

"It's not fantastic in the least," Mr. Farnsworth denied promptly. "We expect to see a wide use of television in the military field. Of course it is impossible to get any War Office in the world to admit or explain its interest in television—probably there isn't another military secret so closely guarded.

"Let me give you an idea of what is happening. Last July all television experiments in Germany, previously controlled by the

Power Giants Bottled In Midget Tubes



A rear view of the modern television set, showing the cathode ray tube in the upper compartment, and sound reproducer at the bottom. It is no larger than an average radio set.

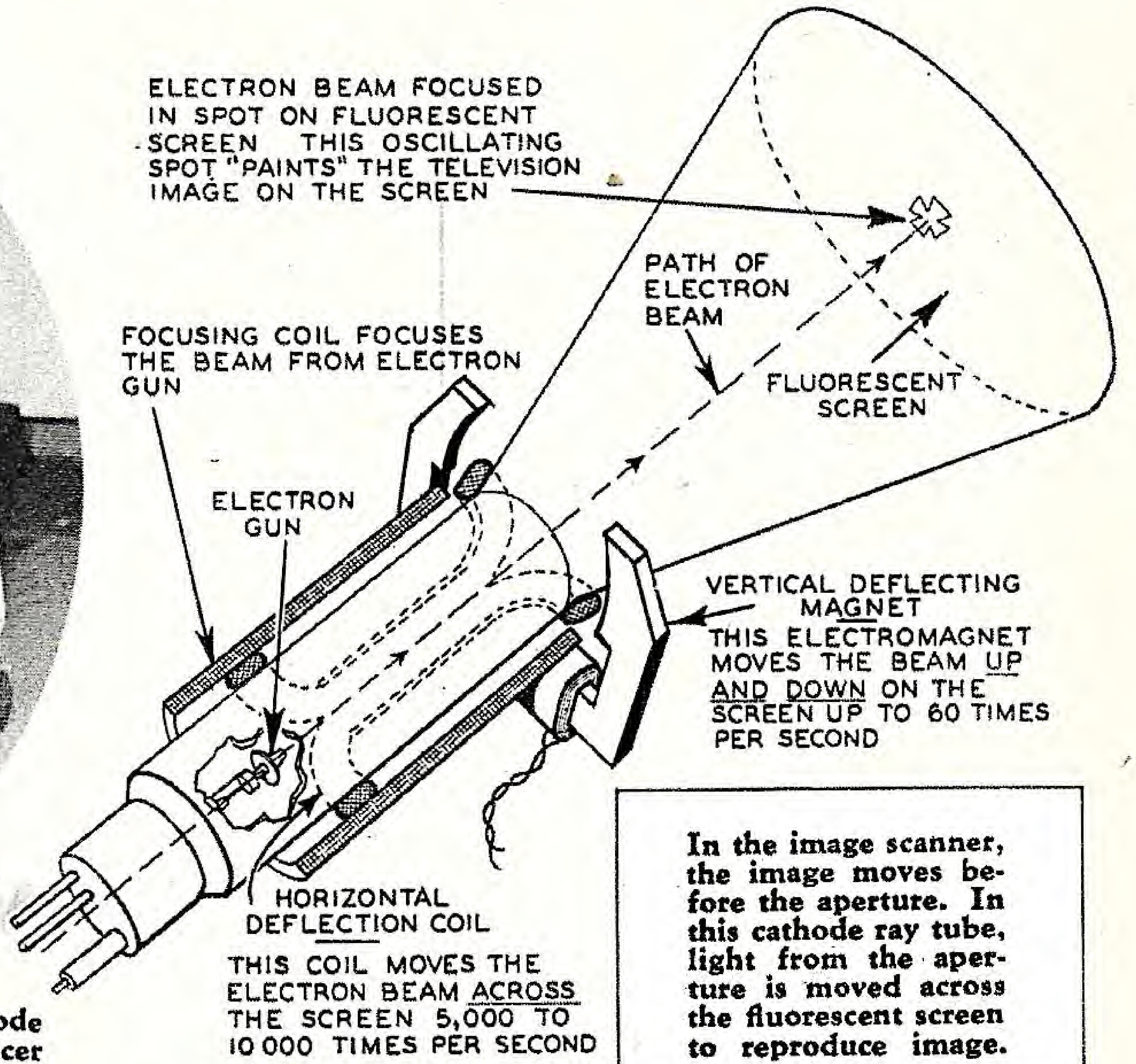
government-owned broadcasting company, were transferred to the German Air Ministry for "flight safety and national protection." This can only mean that the Germans are developing television as a vitally important branch of military aviation.

"France replied to this threat by speeding up television research. A transmitter from the Eiffel Tower is now in operation. In England, the Baird Company, licensees under the Farnsworth system, are already manufacturing receivers to sell for $250. In Italy, Russia and Japan experiments are in progress. What one country is doing, you can be sure all other countries are doing!"

This intense military interest in television can only mean that the next great war will be fought along revolutionary lines. Television spies will be scattered behind the battlefronts and will flash detailed pictures of what is going on in disputed territory. Surprise attacks will become impossible; mass movements of troops will be detected immediately. Big guns will be immediately blown to bits, for the television eye dangling from an airplane will detect the telltale smoke of its shell fire, and the exact range will be easily computed by the enemy.

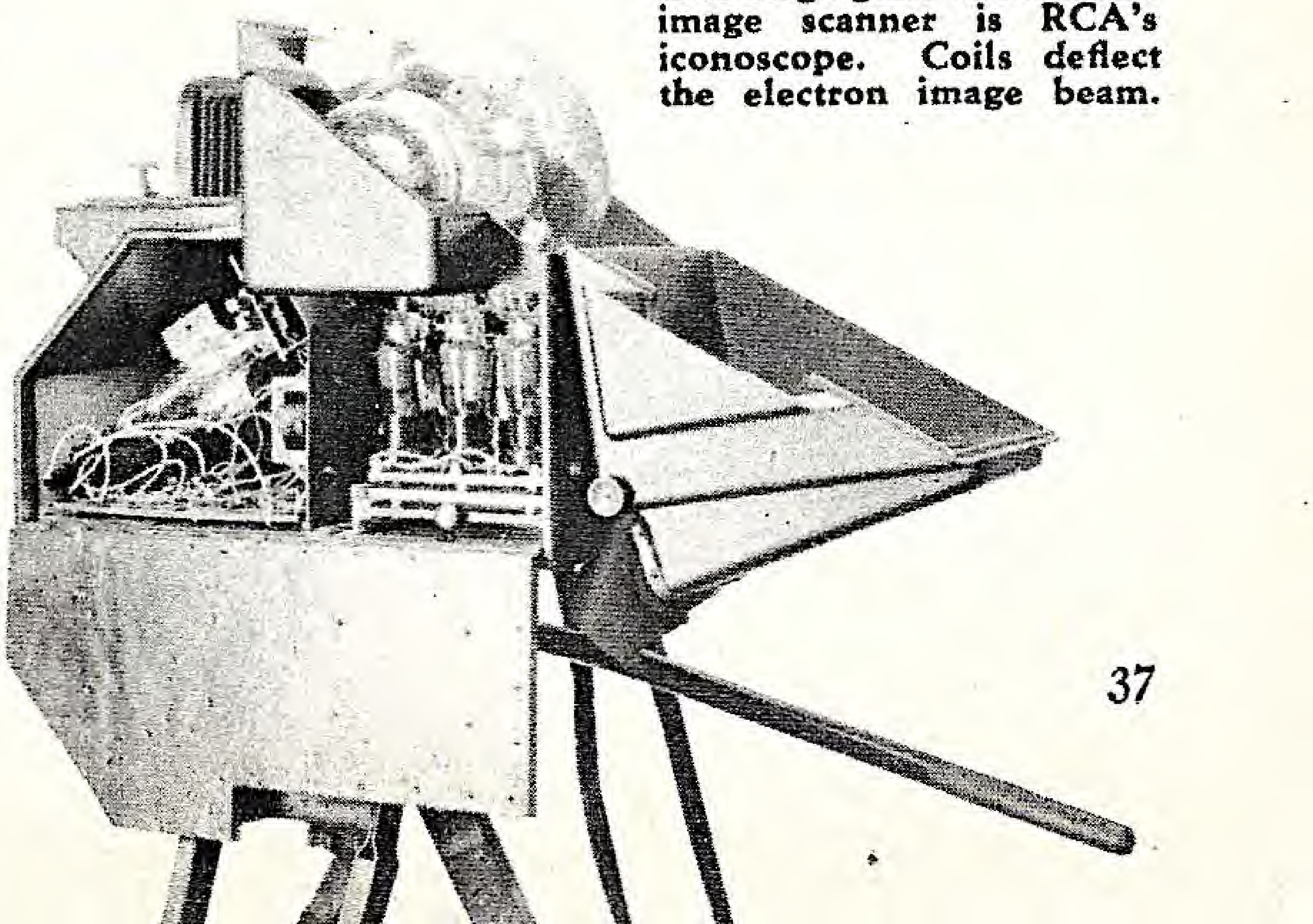
Even more romantic are some of the other uses of television suggested by Mr. Cruse,

[*Continued on page* 123]


ELECTRON BEAM FOCUSED IN SPOT ON FLUORESCENT SCREEN THIS OSCILLATING SPOT "PAINTS" THE TELEVISION IMAGE ON THE SCREEN
PATH OF ELECTRON BEAM
FOCUSING COIL FOCUSES THE BEAM FROM ELECTRON GUN
FLUORESCENT SCREEN
ELECTRON GUN
VERTICAL DEFLECTING MAGNET
THIS ELECTROMAGNET MOVES THE BEAM UP AND DOWN ON THE SCREEN UP TO 60 TIMES PER SECOND
HORIZONTAL DEFLECTION COIL
THIS COIL MOVES THE ELECTRON BEAM ACROSS THE SCREEN 5,000 TO 10 000 TIMES PER SECOND

In the image scanner, the image moves before the aperture. In this cathode ray tube, light from the aperture is moved across the fluorescent screen to reproduce image.

Two types of bottled giants are shown here. At right Dr. V. K. Zworykin of RCA examines a new electron multiplier tube of tremendous amplifying power. Inset, below—The multipactor tube invented by Farnsworth. This tube can take any current and convert it into energy a million times greater than its original strength almost immediately.



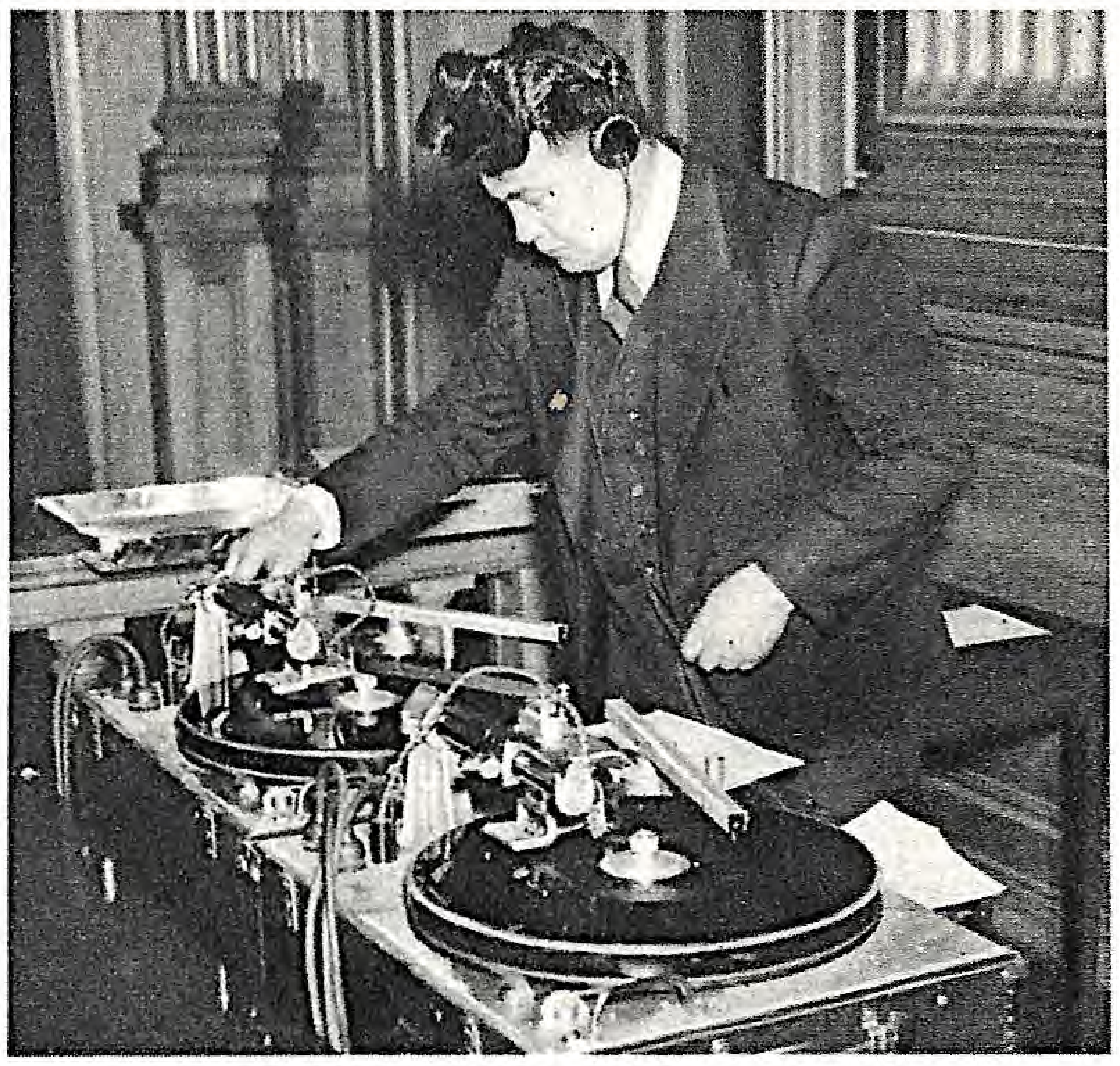
The large glass tube in this image scanner is RCA's iconoscope. Coils deflect the electron image beam.

Mechanical Reporter Substitutes for Human Stenographer

A MECHANICAL reporter, used for the first time at a Federal Communications hearing in Washington, threatens to replace the human stenographer.

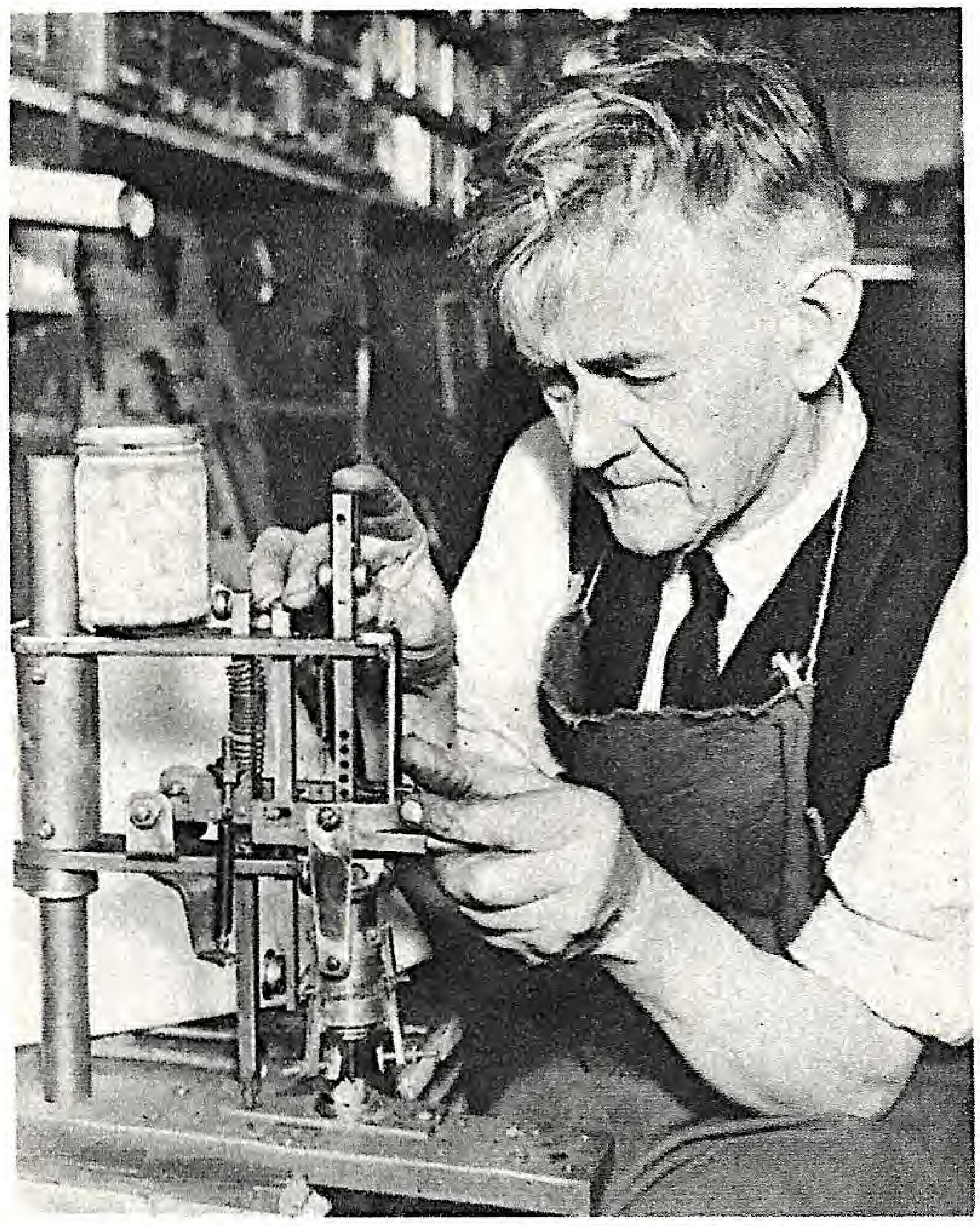
Two large phonograph-type records are employed. When the first record is consumed, the machine automatically shifts to the other record.

The recorder operates with 100 per cent accuracy. It can take dictation at any speed and occupies only the space of any ordinary desk. It is said to be especially adaptable to courtroom use. Special devices render the machine practically noiseless.



This mechanical reporter employs two large phonograph-type records. When the first record is consumed the machine automatically shifts to the other. It is useful in court rooms.

Pit Extractor Leaves No Mark



Louis E. Marsh is at work on his pit machine which pits an olive or cherry so quickly and perfectly the operation is almost imperceptible. It leaves the fruit in perfect shape.

A MACHINE invented by Louis E. Marsh of San Francisco can pit a cherry or an olive so quickly the action is almost imperceptible. A quick pressure on the vertical bar sends a pair of sharp steel fingers into the fruit as it is held firm by three brackets after which the up stroke brings out the pit and leaves the fruit in perfect shape except for a tiny slit where the stem enters.

In practice the pit machine has operated flawlessly.

Giant Mirror Makes Perilous Trip

THE history of the 200-inch telescope disk for the new observatory of the California Institute of Technology has been one of successive engineering triumphs. The latest of these was the transporting of the disk 3,300 miles from Corning, N. Y. to Pasadena, Cal.

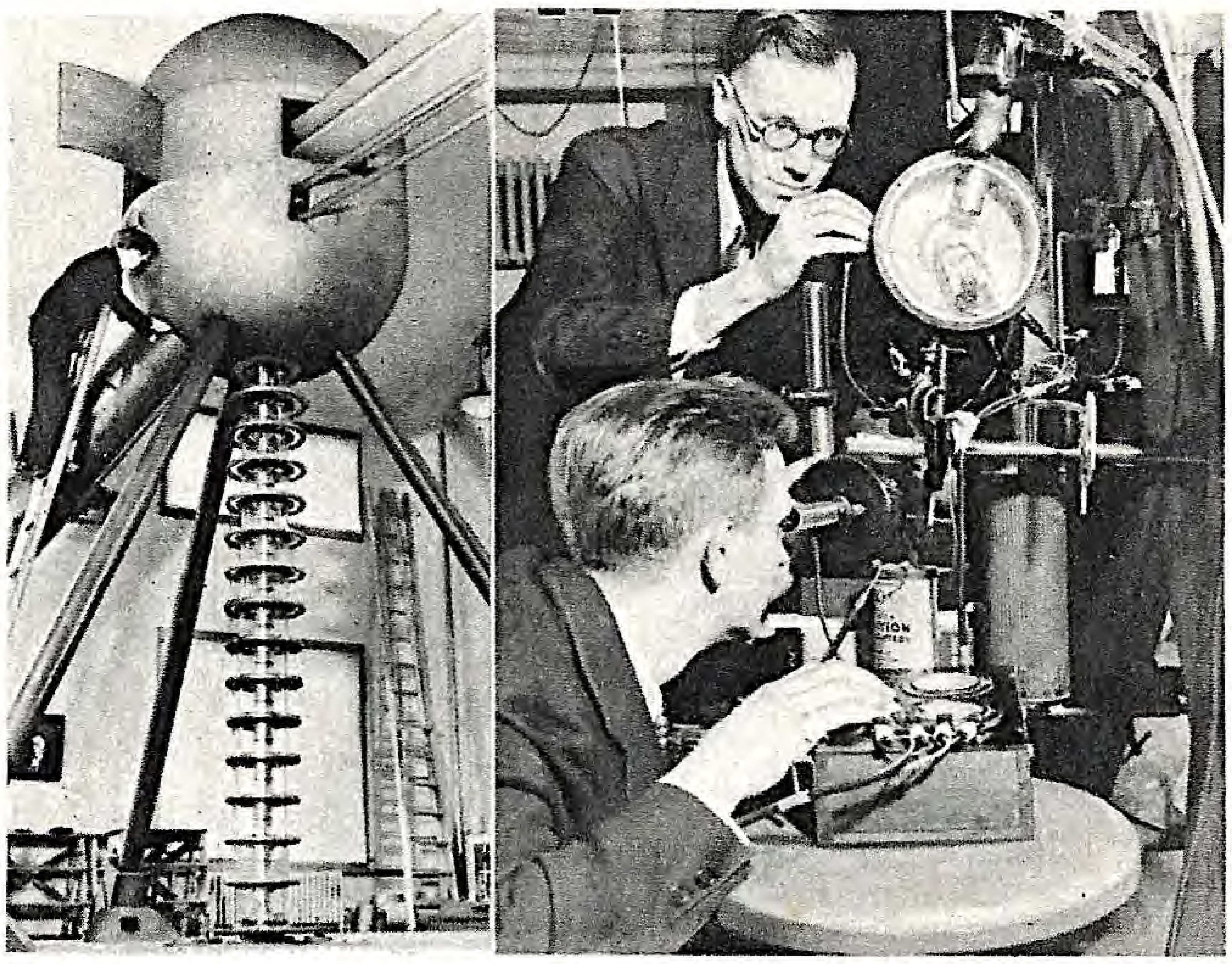
To make the trip the disk not only had its private car but a private train as well. The disk, encased in a ten-ton steel crate, rested on a specially constructed flat car built so low it had but 5½ inches of clearance above the ties. Even so, the disk passed under one bridge with a clearance of but three inches.

Drawn by a slowly moving train, the 200-inch mirror for the world's largest telescope starts its 3,300-mile journey. The trip was one of the most difficult in transportation annals.

Atomic Force Measured In Giant Electronic Test Tube

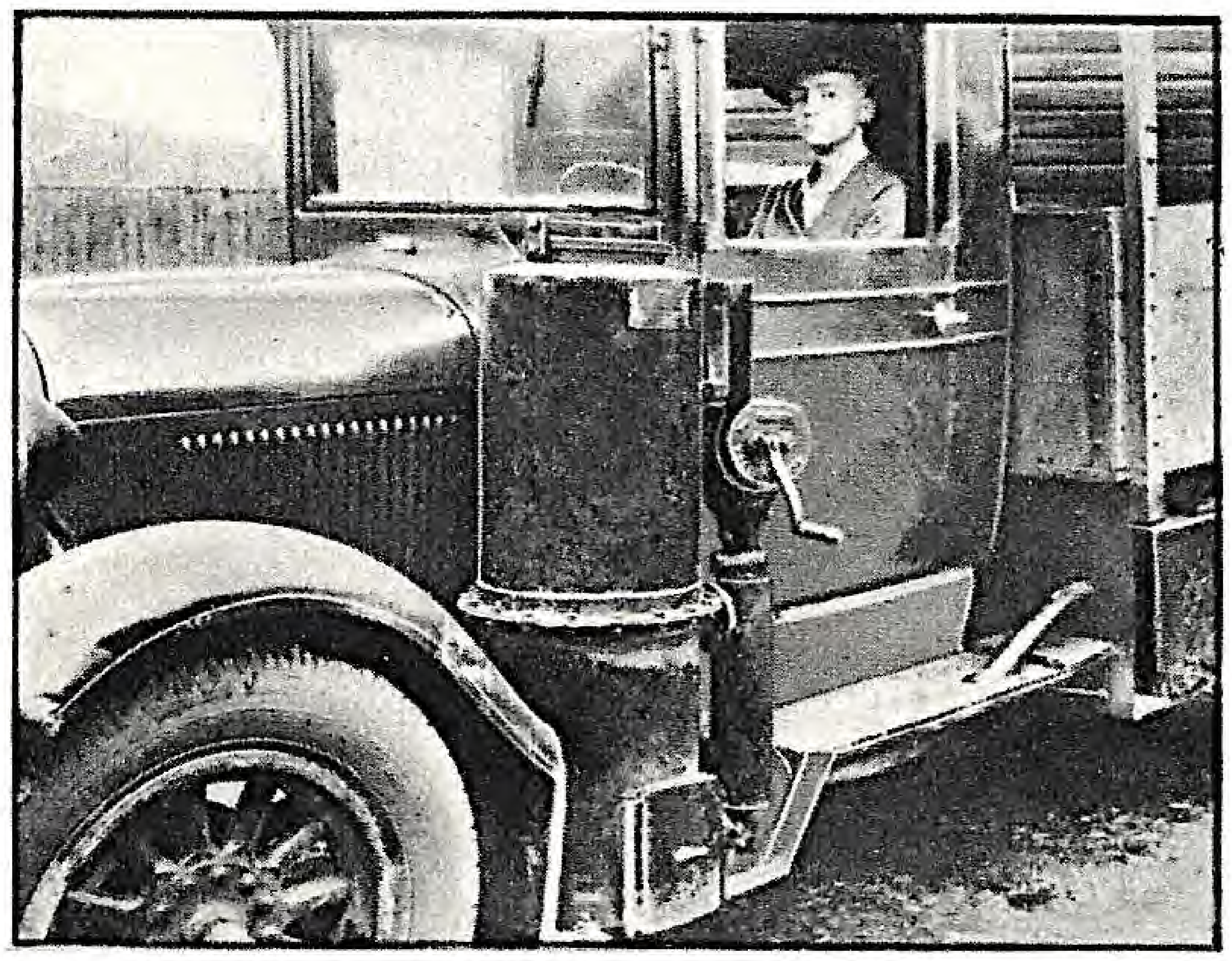
PENETRATING deeper into the mysteries of science Dr. M. A. Tuve and his assistant, Dr. L. R. Hafstad, of the Department of Terrestial Magnetism at the Carnegie Institute of Washington hope to measure atomic force on instruments developed by them through years of research.

Working in the institute's laboratories the two scientists have set up elaborate equipment for making the measurements. One of the devices used by them is a huge static electricity instrument looking very much like a giant test tube and distiller. With this device and similar electronic devices they may find the answer to a problem which has for years puzzled scientists throughout the world. Similar research is being conducted in schools throughout the world.



Dr. M. A. Tuve and Dr. L. R. Hafstad of the Carnegie Institute of Washington are shown during their experiments on measuring atomic force. Giant test tube-like electro-static device, at left, may hold solution to their problem.

Motor Truck Runs On Wood Fuel



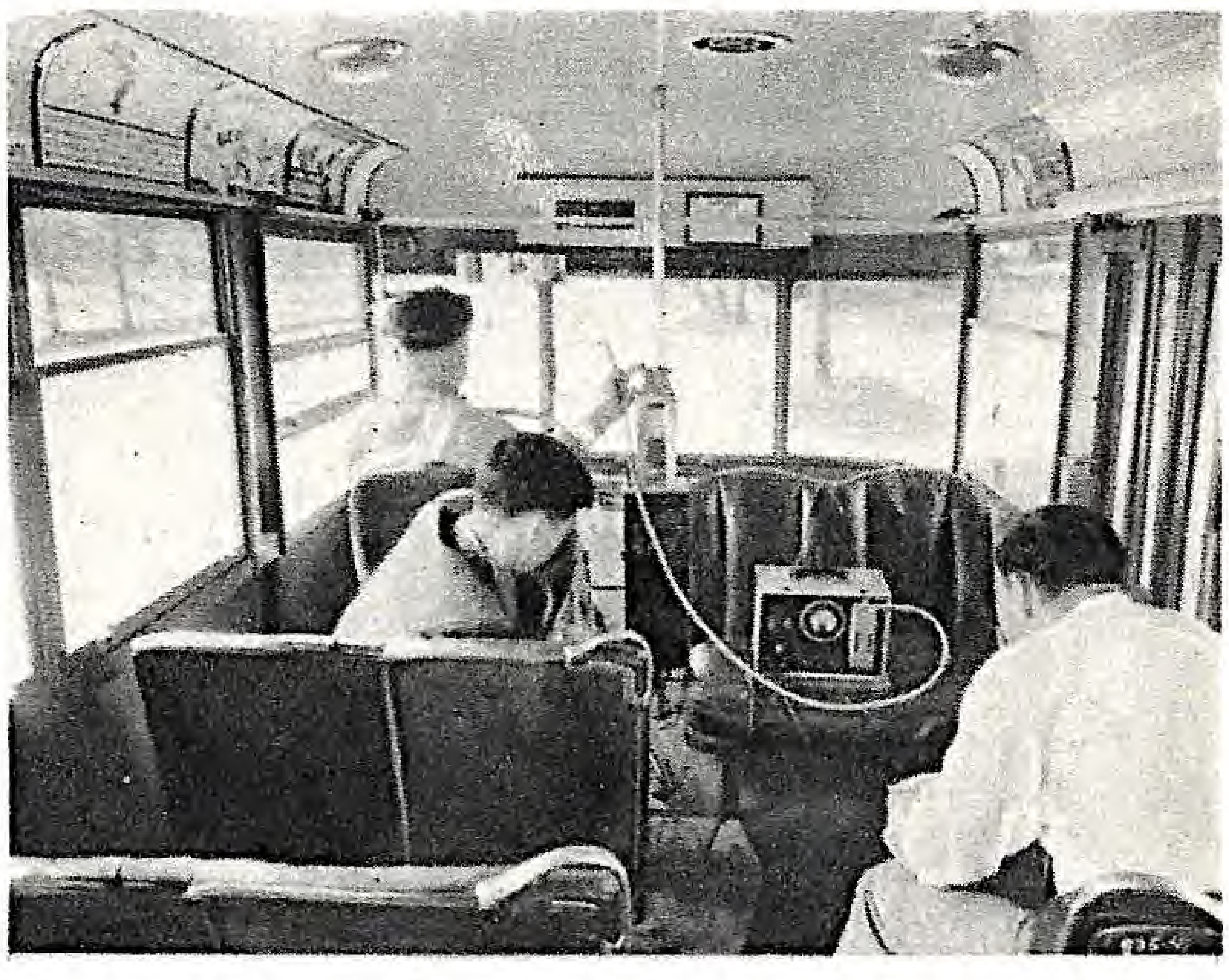
The high cost of gasoline does not bother the owner of this novel truck. Provided with a firebox on the running board, vehicle uses wood for supplying the necessary motive power.

CHEAPER than an oil burning car is one which operates on wood. The odd car, the invention of Col. J. S. Anderson of Vancouver, B. C., is provided with an attachment that converts wood into carbon monoxide. The carbon monoxide gas is then drawn into manifold to operate car in usual manner.

While wood burning cars have been in use in Germany for the past few years the Anderson truck is the first of its type in America.

Device Detects Poison Gas In Autos

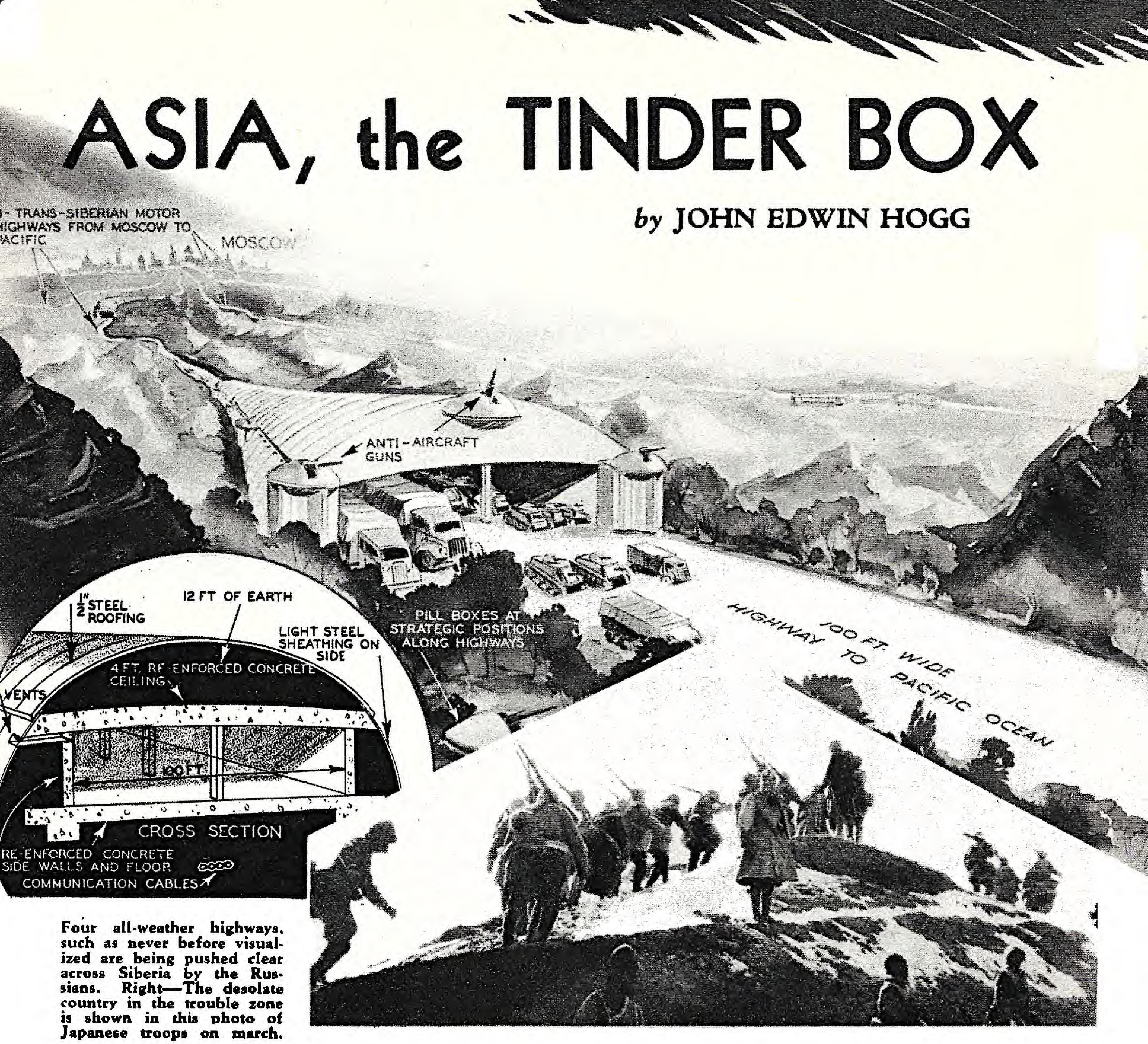
AS A protection against possible carbon monoxide poisoning an instrument has recently been introduced for checking the amount of gas present in closed automobiles and busses. Operated by a small electric pump, which is part of the instrument, the air is drawn through a metallic sampling hose into a dehydrating canister. Here it has all the moisture removed from it after which it passes through a cell containing a catalyst which oxidizes to carbon dioxide any carbon monoxide that may be present. A thermocoupled ammeter indicates gas present.



As an added safety measure for bus patrons the instrument shown on the seat tests the air for possible traces of carbon monoxide gas. A meter measures percentage of gas present.

ASIA, the TINDER BOX

by JOHN EDWIN HOGG


- TRANS-SIBERIAN MOTOR
IGHWAYS FROM MOSCOW TO
ACIFIC
MOSCOW
ANTI-AIRCRAFT GUNS
PILL BOXES AT STRATEGIC POSITIONS ALONG HIGHWAYS
100 FT. WIDE HIGHWAY TO PACIFIC OCEAN
$\frac{1}{2}$" STEEL ROOFING
12 FT OF EARTH
LIGHT STEEL SHEATHING ON SIDE
4 FT. RE-ENFORCED CONCRETE CEILING
VENTS
100 FT
CROSS SECTION
RE-ENFORCED CONCRETE SIDE WALLS AND FLOOR
COMMUNICATION CABLES

Four all-weather highways, such as never before visualized are being pushed clear across Siberia by the Russians. Right—The desolate country in the trouble zone is shown in this photo of Japanese troops on march.

WITH war clouds hanging ominously over Africa and the whole of Europe, a far more serious threat to world peace is rapidly approaching a climax in the Far East. Here the interests of Japan and Russia have fallen into a conflict apparently impossible of settlement short of a military clash. Steadily and irresistibly Japanese and Russian forces are converging upon Mongolia, No-Man's Land of Asia.

While Europe frantically prepares for war along every land frontier, at sea and in the air, events of world-wide significance have pointed toward war between Russia and Japan for the past four years. We don't hear much about it because vast distances, poor communications and the military censorships of Tokyo, Nanking, Hsinking and Moscow have been fairly successful in keeping these happenings from the ears and eyes of the world. Nevertheless, qualified observers feel that it is only a question of time before the shots of recent "border incidents" along the Siberian frontier may set off an explosion that will shake the earth.

Japan has definitely announced her intention of expanding into the Asiatic mainland. In Tokyo it is no longer a military secret that she intends to drive Russia from the Pacific. Russia, on the other hand, is determined to hold what she has and will not be driven except by superior military force. In the Russian Sea of Okhotsk, one of the richest fishing grounds on the face of the earth, the interests of the two nations are ensnarled over the fishery rights. Japan's occupation of Manchukuo and her more recent thrusts toward Siberia through Mongolia is a deadly threat to Russia. Both nations are facing grim realties. Both will fight to the finish

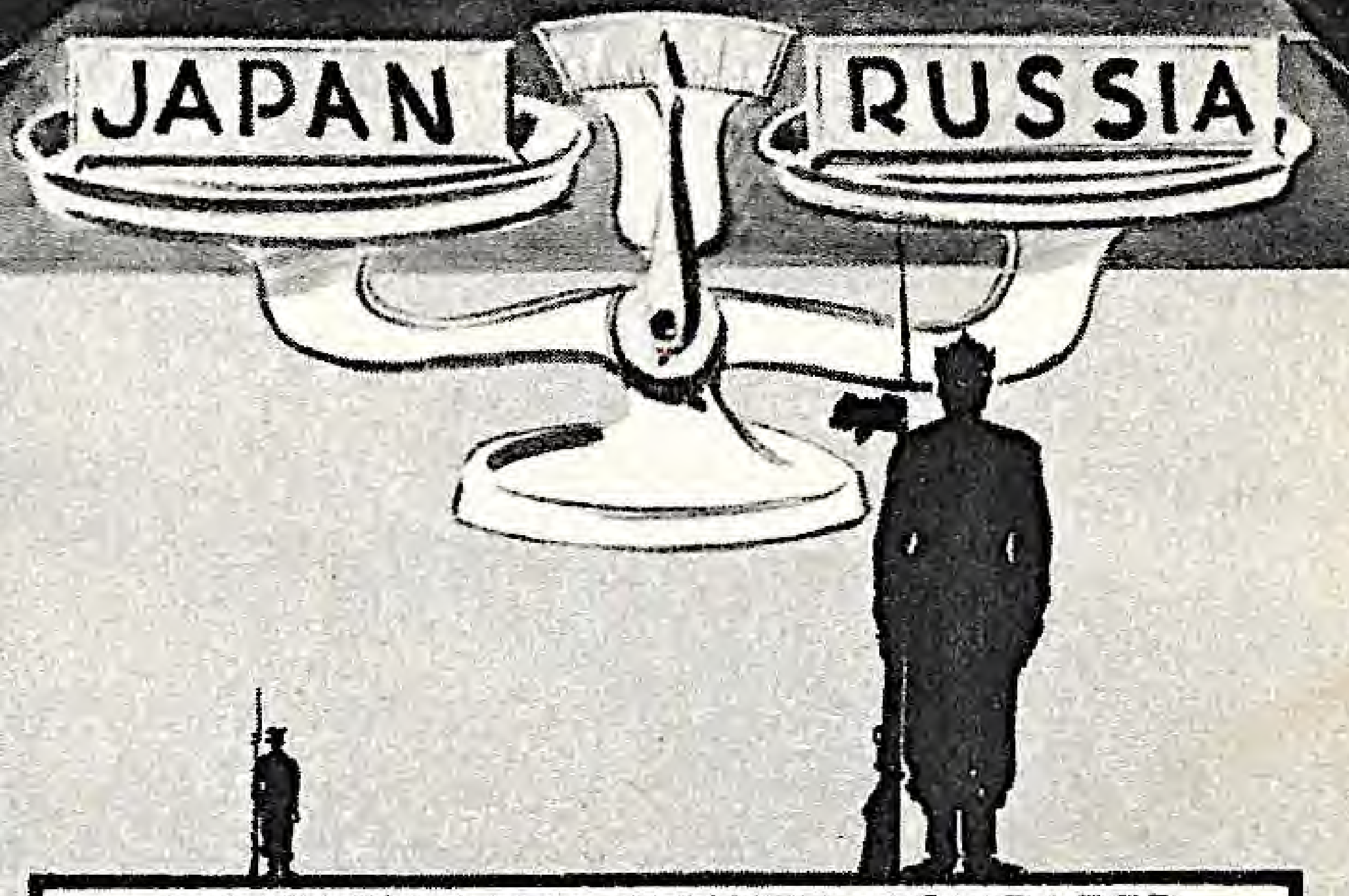
# of WAR

Up behind the black clouds over Mongolia wait the Four Horsemen, soothing their champing steeds. For soon may come the age-old cry. Then War, Pestilence, Famine and Death will ride the poverty-stricken old world again.

before they will brook obstruction of their national destinies.

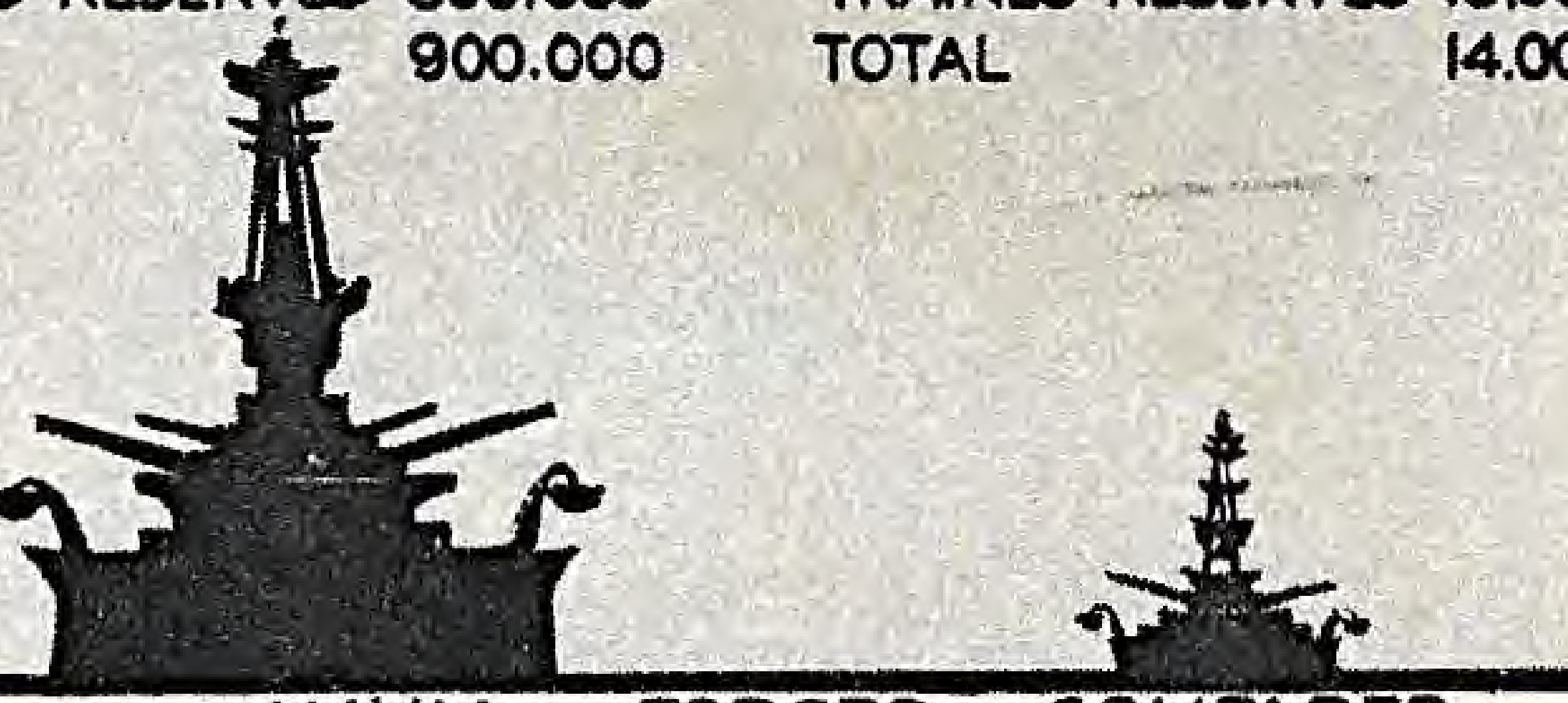
Hostilities are scheduled to begin in Outer Mongolia. Japan by clinching her hold upon Manchukuo has checkmated the threat of a Soviet thrust southward from Siberia's maritime province. By strategically gaining control of the Chinese Eastern Railway she has shifted her first line of defense a thousand miles inland from the Sea of Japan. The Trans-Siberian Railway from Manchuli clear around the northern frontier of Manchukuo to its Pacific terminus at Vladivostok now lies literally under the bayonets of the Japanese army. This move on the part of Japan proves she contemplates winning a modern Russo-Japanese War by the identical trick that defeated the Tsar in 1905—by slicing lines of transportation and communication to leave the Russians hog-tied with the problem of moving troops and equipment across 4,000 miles of Siberian wilderness.

The Russians, however, are not asleep. Realizing that disruption of their only completed rail line to Vladivostok would leave their military efforts mastheaded far in the interior of Siberia, they have taken effective steps to prevent such a thing from happening. They are double-tracking the Trans-Siberian Railway throughout its length. Simultaneously, they are rushing the construction of a new, alternate, double-track line to the Pacific from Nizhniiudinsk around the



MILITARY MAN POWER COMPARED

STANDING ARMY	300.000	STANDING ARMY	1.000.000
TRAINED RESERVES	600.000	TRAINED RESERVES	13.000.000
TOTAL	900.000	TOTAL	14.000.000



NAVAL FORCES COMPARED

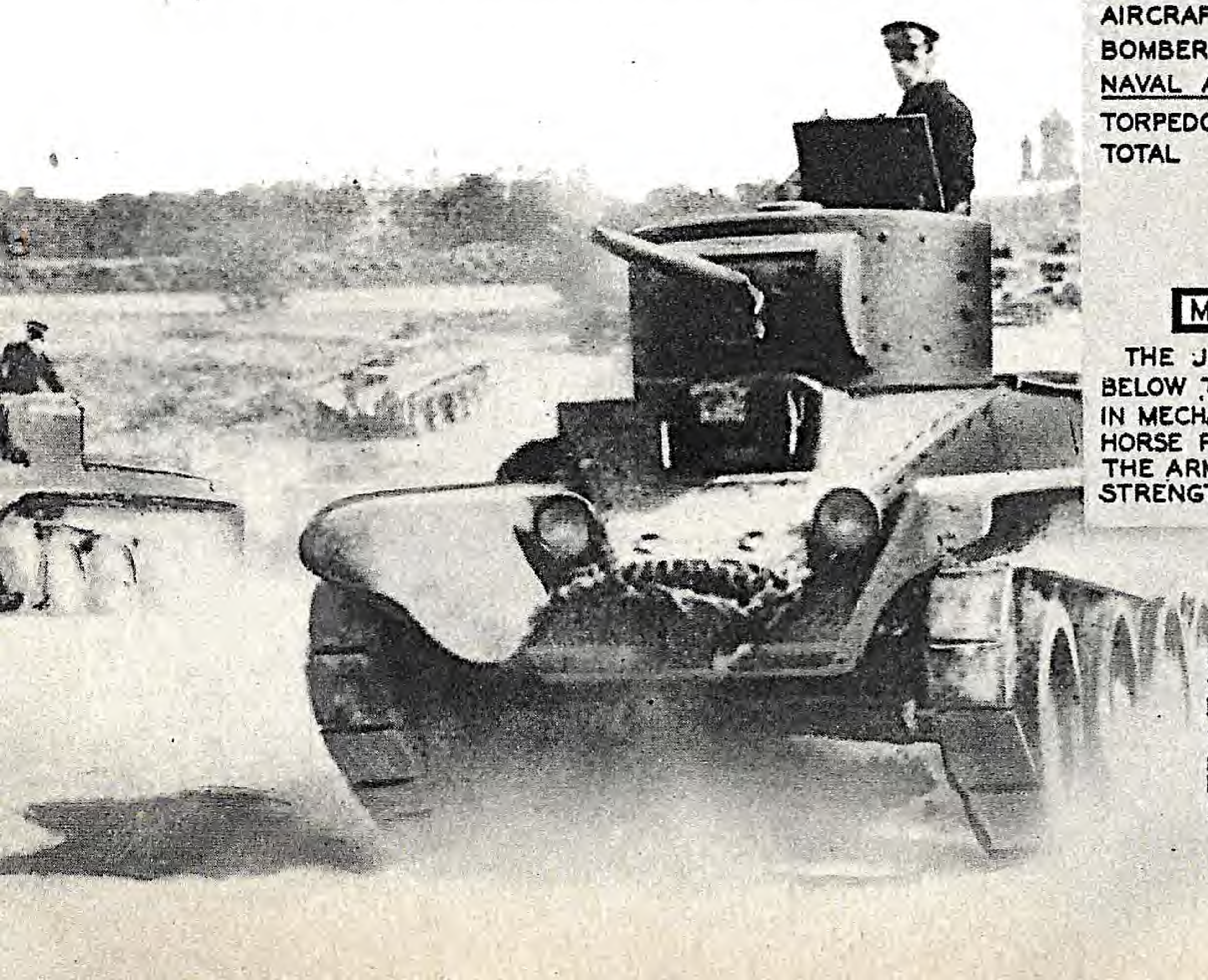
BATTLESHIPS	10	OLD BATTLESHIPS	3
AIRPLANE CARRIERS	6	MODERN BATTLESHIPS	2
CRUISERS	36	MODERN CRUISERS	12
DESTROYERS	102	DESTROYERS	68
SUBMARINES	60	SUBMARINES	186-?
MINE LAYERS	18	ICE BREAKERS	8
ALL MODERN		MINE LAYERS	9

JAPAN AND RUSSIA IN THE AIR

TOTAL NUMBER OF MILITARY AIRCRAFT	2,010	TOTAL NUMBER OF MILITARY AIRCRAFT	5,232
BOMBERS	490	BOMBER	2,086
NAVAL AIRCRAFT		NAVAL AIRCRAFT	
TORPEDO CARRIERS	127	TORPEDO CARRIERS	426
TOTAL	870	TOTAL...	1,012

MECHANIZATION OF MILITARY EQUIPMENT

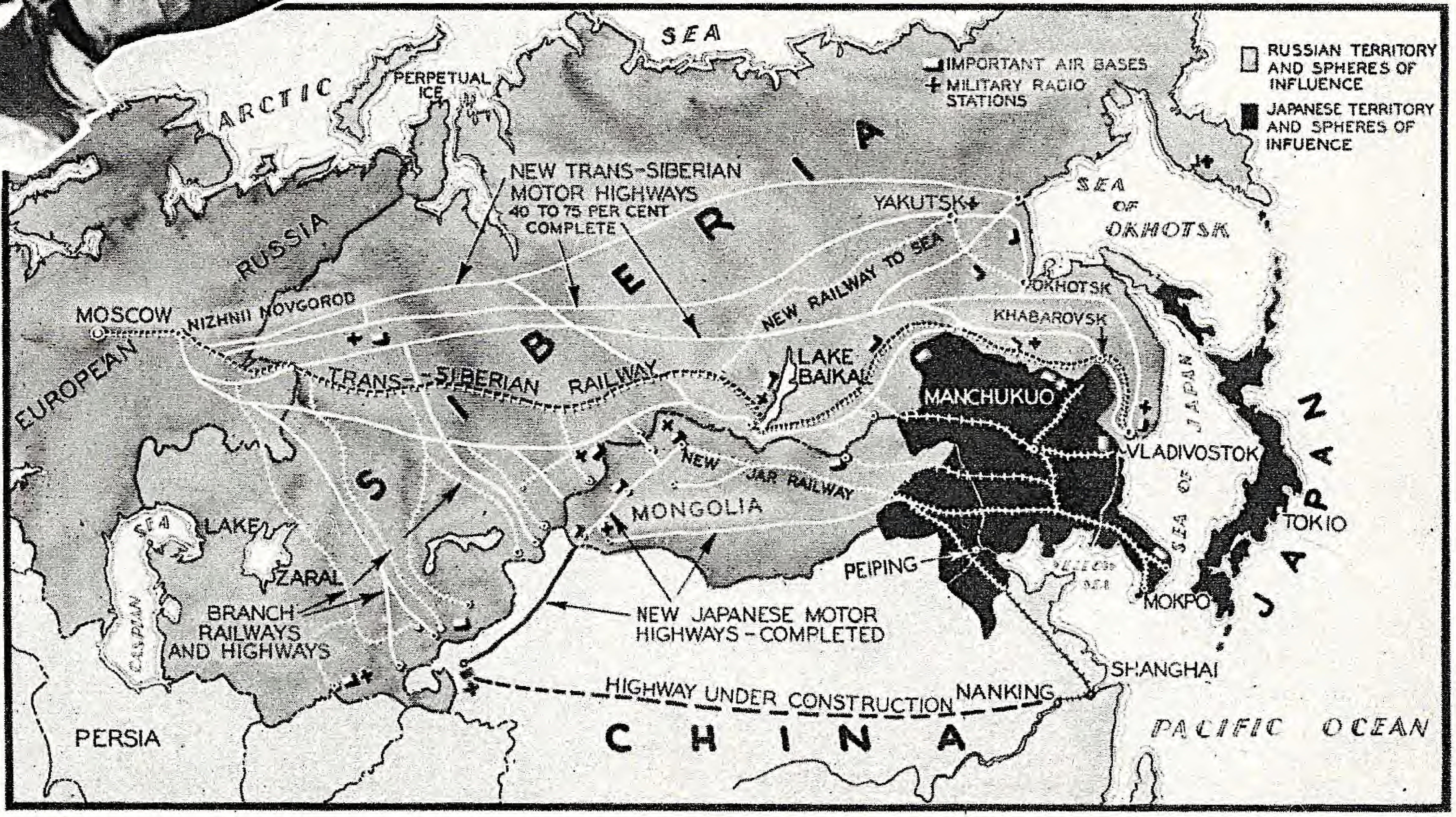
THE JAPANESE ARMY IS BELOW THAT OF ITALY IN IN MECHANIZATION, 2.05 IE HORSE POWER PER MAN OF THE ARMY'S PEACETIME STRENGTH	THE RUSSIAN ARMY HAS THE HIGHEST DEGREE OF MECHANIZATION OF ANY FORCE IN THE WORLD 24.76 HORSEPOWER PER MAN OF THE ARMY'S PEACETIME STRENGTH



Russia has perfected tank mechanism to the nth degree. There are 100-mile-an-hour tanks, amphibious tanks, midget tanks which climb with all the agility of mountain goats, steel moles that dig themselves in to become one-man fortresses, all armed with light cannon and heavy calibre machine guns.

Manchukuo Is Hot Bed of Orient

Japan has as many troops on the South Siberian frontier as Russia has strung along the north, so machine guns and automatic rifles will minimize roving infantry and raids in Asia's No-Man's Land of Tomorrow. The map below sketches the probable theatre of war, existing railroads and the highways.


SEA
ARCTIC
PERPETUAL ICE
IMPORTANT AIR BASES
MILITARY RADIO STATIONS
RUSSIAN TERRITORY AND SPHERES OF INFLUENCE
JAPANESE TERRITORY AND SPHERES OF INFUENCE
NEW TRANS-SIBERIAN MOTOR HIGHWAYS 40 TO 75 PER CENT COMPLETE
SIBERIA
YAKUTSK
SEA OF OKHOTSK
RUSSIA
EUROPEAN
MOSCOW
NIZHNII NOVGOROD
NEW RAILWAY TO SEA
OKHOTSK
KHABAROVSK
TRANS-SIBERIAN RAILWAY
LAKE BAIKAL
MANCHUKUO
VLADIVOSTOK
SEA OF JAPAN
JAPAN
NEW JAR RAILWAY
MONGOLIA
TOKIO
PEIPING
YELLOW SEA
MOKPO
SEA
LAKE ZARAL
CASPIAN
BRANCH RAILWAYS AND HIGHWAYS
NEW JAPANESE MOTOR HIGHWAYS - COMPLETED
SHANGHAI
HIGHWAY UNDER CONSTRUCTION
NANKING
PERSIA
CHINA
PACIFIC OCEAN

north shore of Lake Baikal, down the Valley of the Lena to Iakutsk and to Udskoiostrog on the Sea of Okhotsk.

It was the breakdown of the 8,000-mile, single track, Trans-Siberian Railway under the burdens of war, and nothing else, that lost Port Arthur, Korea, Manchuria and the southern half of Sakhalin for the Tsar in 1905. The Soviet isn't going to let that happen again. The completion of the present railway construction will give them the equivalent of four Trans-Siberian lines. Still they have not lost sight of the fact that railways are vulnerable to acts of war. So, as an added precaution, four, new, all-weather highways are being pushed clear across Siberia to provide an alternate method of military transport from Nizhniinovgorod to the Sea of Okhotsk. No such highways have ever before been visualized by the mind of man. They are 100 feet wide and paved with concrete. Nearly 400 miles of their length will be through bomb-proof "snow-sheds." There will be 200 miles of such "snow-sheds" over exposed portions of the new rail lines. Call them snow-sheds if you like that name. They are of steel and concrete construction. Their sidewalls are protected by sloping embankments of earth 40 feet wide at the base. They are topped with a 4-foot layer of reenforced concrete. Then there's a 12-foot layer of earth on top of the concrete. The top of the earth layer is faced with a half-inch sheeting of steel. The most powerful aerial bomb

Bombproof Highways Foil Air Attack

would detonate upon contact with the steel sheeting. The layer of earth and concrete would take up the shock of the explosion. The reader may draw his own conclusions.

Elaborate preparations are also being made for the defense of these transportation routes against aerial attack. Pill-box fortresses with lids like the door of a trap-door spider's nest, house anti-aircraft batteries guarding every strategic position.

Deep underground beneath these highways goes the world's most remarkable subterranean telegraph, a system of cables from Moscow to the Pacific—invulnerable to weather, invulnerable to ordinary acts of war. They will insure the privacy of military messages that radio cannot offer.

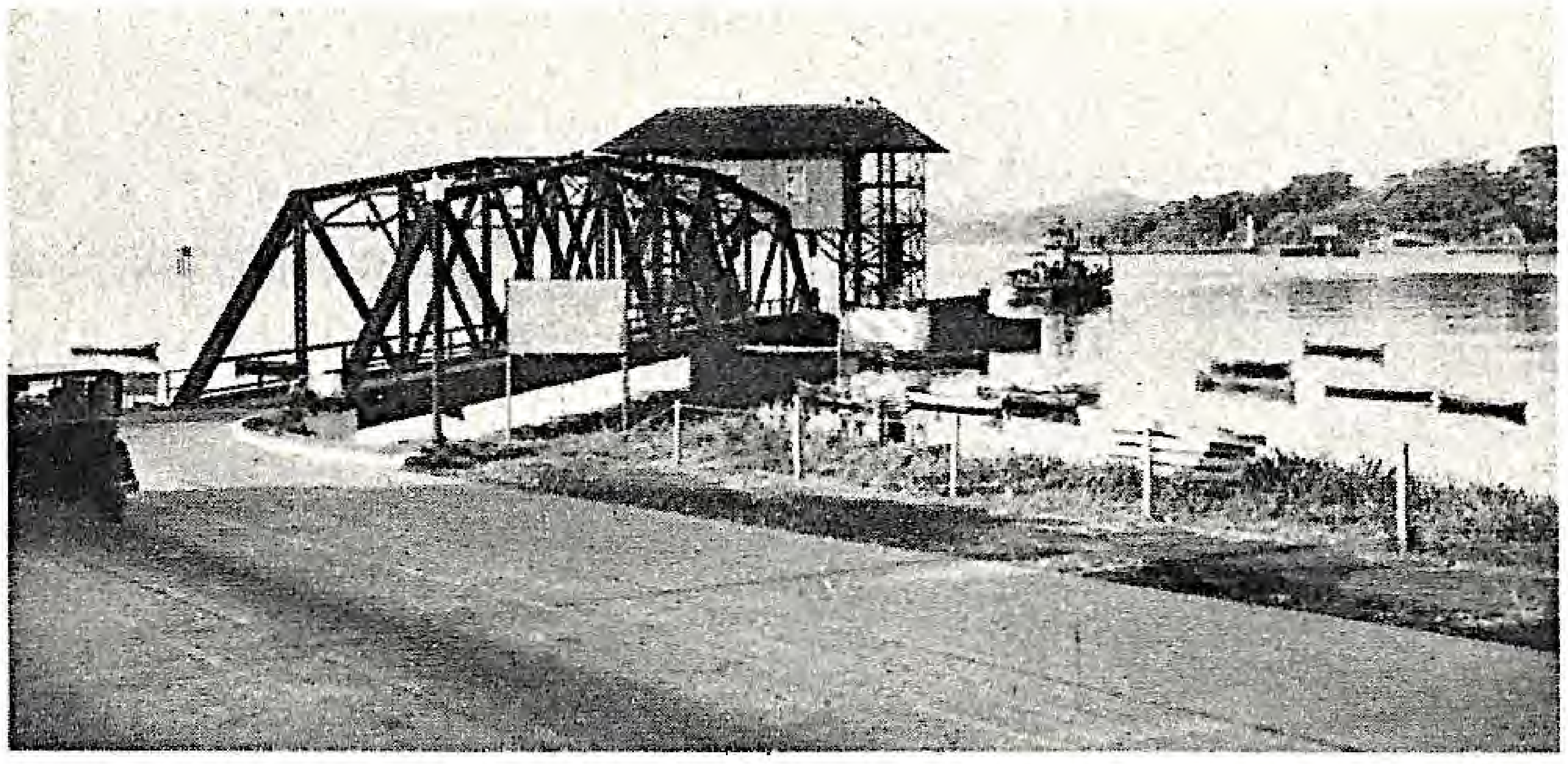
The U. S. S. R. is building 5,760 miles of new railways along the Mongolian-Sinkiang-Siberian frontier and double tracking 3,000 miles of branch lines already in operation. Parallel to these lines goes a similar length of improved motor highways. These railways and highway improvements, now from 40 to 75 per cent complete, point like the fingers of a hand at Mongolia from Afghanistan to Manchukuo.

When Germany and Poland threatened to "gang up" on Russia in the event of a Russo-Japanese clash, Stalin, Soviet's No. 1 man, passed the word from Moscow that Russia stands ready to "blow all the Facist bandits off the face of the earth." Immediately there was a great stir along the Siberian frontier. Soviet forces by the tens of thousands began moving in. With them came an endless array of military equipment. And what equipment! About 1,500 of the finest airplanes ever assembled, hundreds of huge fighting tanks—tanks that go 100 miles per hour over level ground—tanks that swim to become river gunboats—little, highly maneuverable tanks that do 60 miles per hour over country where a goat would find the going difficult—tanks that dig into the earth to become tiny forts when things get too hot for them—digging machines that run military trenches at the rate of one mile per hour laying their own defensive earthworks as they zig-zag toward

[*Continued on page* 127]

Steadily and irresistibly both Russian and Japanese forces close in on Mongolia, with reserves being readied daily. The Japanese (above) prefer to season their cavalry with the bitter cold of actual war conditions. Right—The Russians are more for elaborate and impressive reviews on their home parade grounds such as armed chariot races. Both nations are sure of winning; both will fight to the finish.

Uncle Sam Operates World's Most Unique Ferry At Balboa



This unique ferry across the Panama Canal joins Balboa in the Canal Zone with Panama proper and forms another important link in the extended chain of motor highways stretching from the plains of Canada to the Argentine.

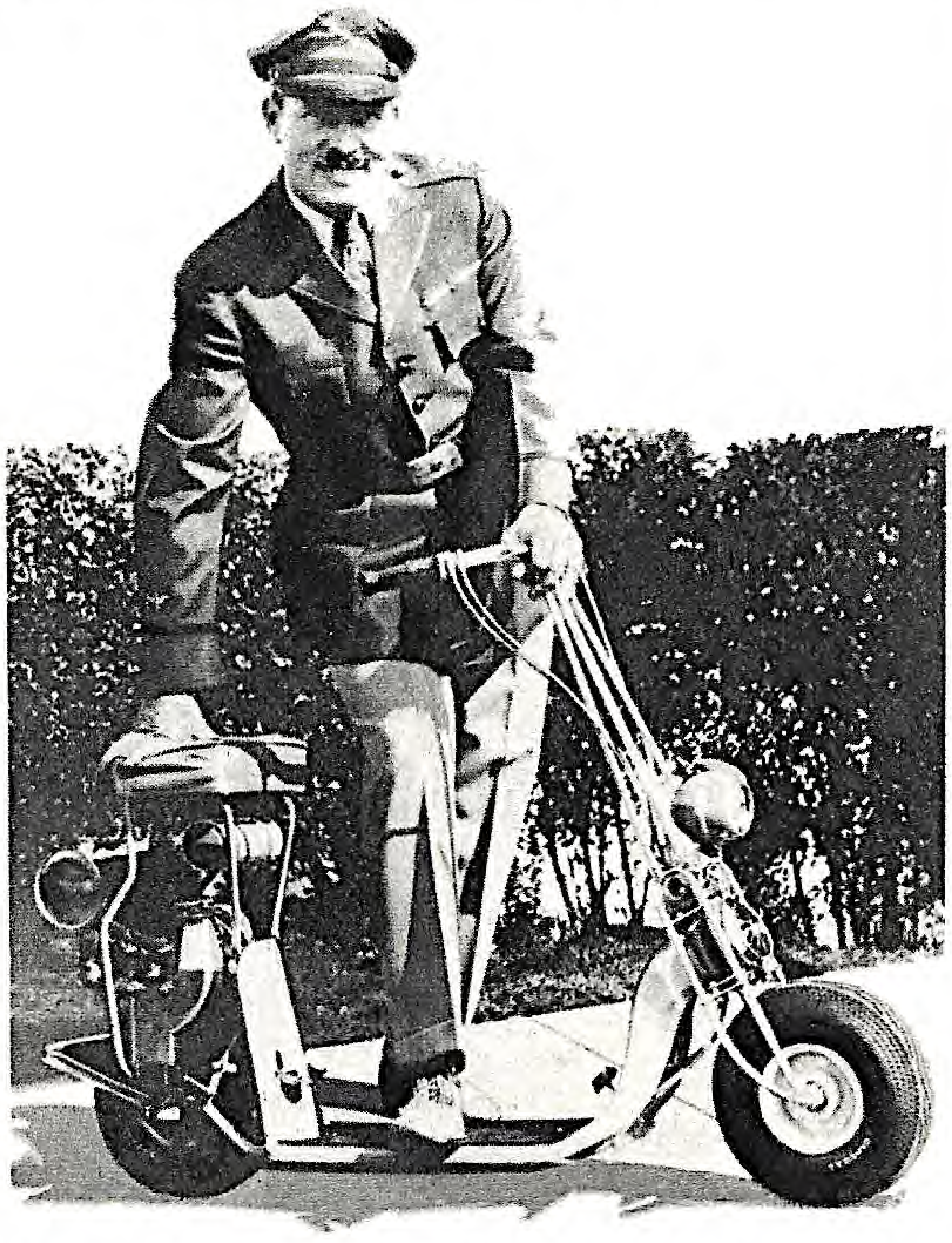
WHEN a tidal variation as great as 22½ feet threatened to stop the plans for a ferry across the Panama Canal at Balboa, Uncle Sam countered with the world's most unique ferry; one that allows for changes in water level.

Engineers constructed ramps jutting out 176 feet from the shore. At the end of each ramp they added a 16-foot apron so rigged that it can be lowered or raised according to the water level while the boat is receiving or discharging passengers or freight. Two boats using 8-cylinder straight Diesel-type engines are used in this ferry service. They have a speed exceeding 9 knots an hour.

Air Ace Introduces Pet Scooter

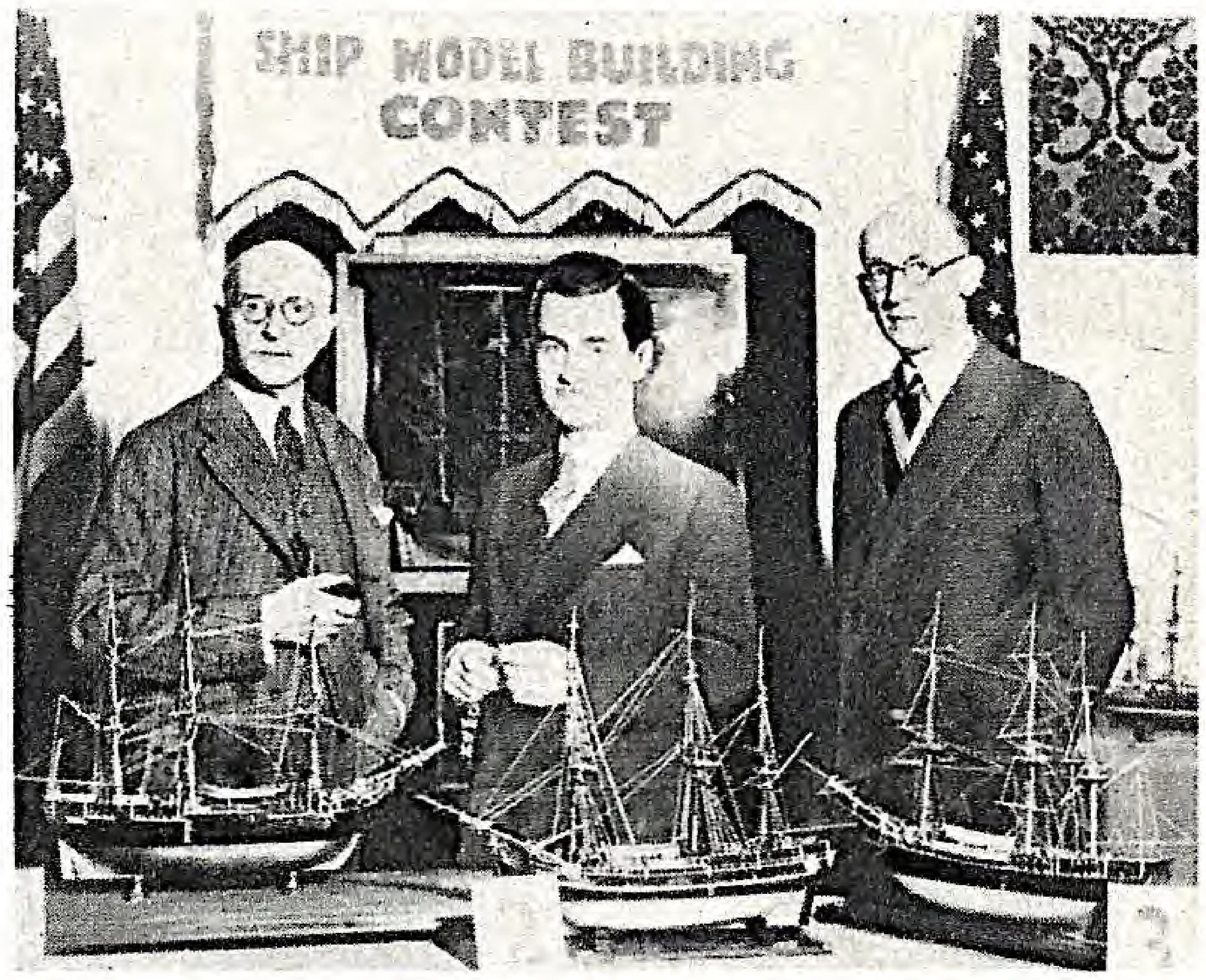
FROM a zipping, high-powered transcontinental airplane to "Junior" a two-wheel motor glide which looks like an overgrown scooter is just a step to ace aviator, Col. Roscoe Turner.

The colonel carries the novel vehicle along with him from airport-to airport. Especially designed for him, he uses it to reach nearby cities when he lands at suburban flying fields. Junior costs his master only a penny fuel cost per five miles of travel.



Here is Col. Roscoe Turner, one of America's ace aviators, about to climb aboard "Junior," his motor glide. Junior chugs about five miles at a fuel cost of one penny.

Model Ship Designers Get Prizes



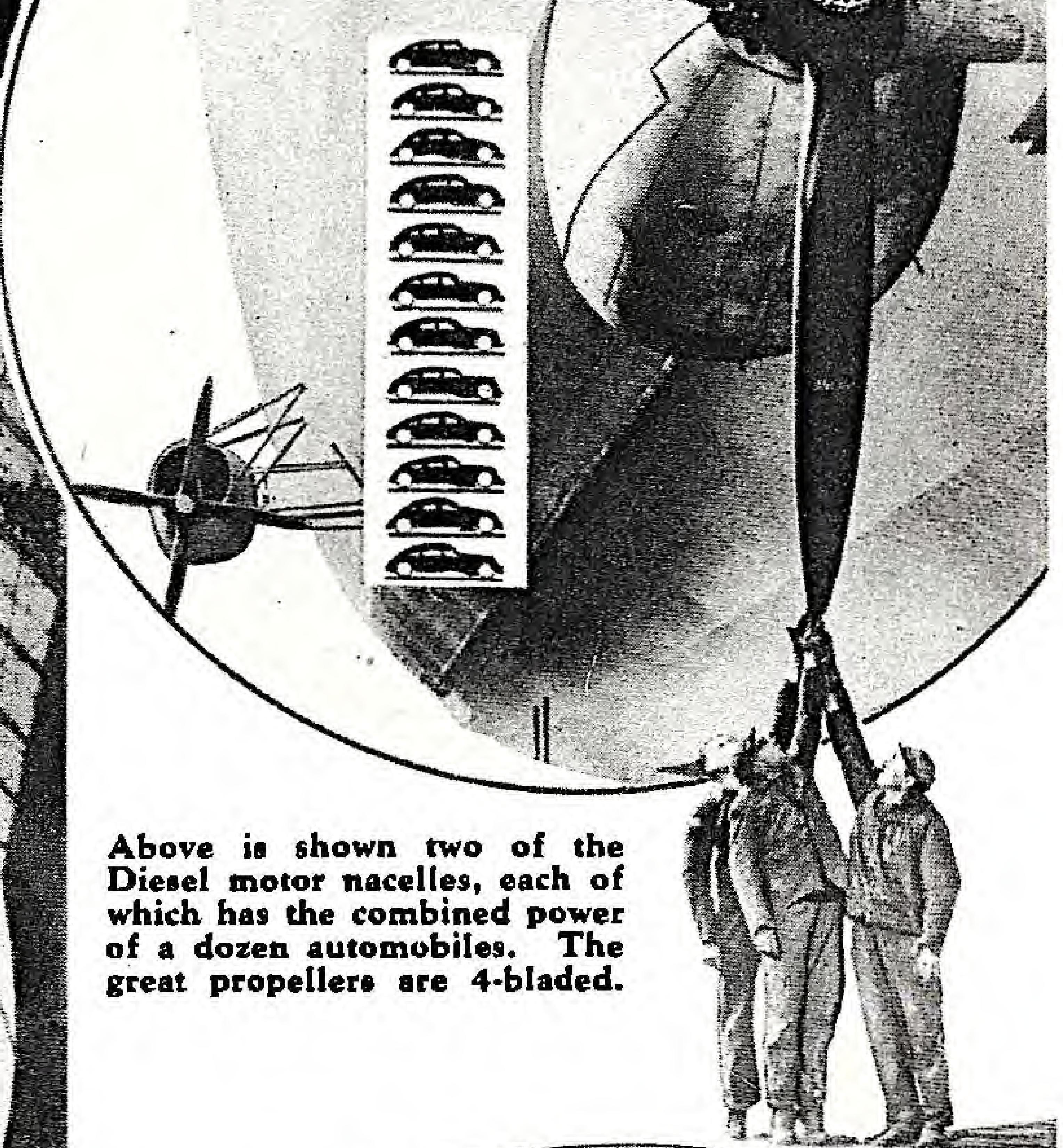
These sleek, exquisitely finished models of His Majesty's Ship "Bounty" took prizes in a nation-wide contest. The judges are Gordon Grant, Lowell Thomas and J. Wenner.

A TRIM model of His Majesty's ship "Bounty," its graceful lines permeated with the spirit of the sea, gained for its designer, I. B. Hinman of Plainfield, New Jersey, the first prize of $500 in nation-wide "Mutiny on the Bounty" ship design contest. More than 10,000 miniature Bounty's were submitted to the judges during the six months of contest.

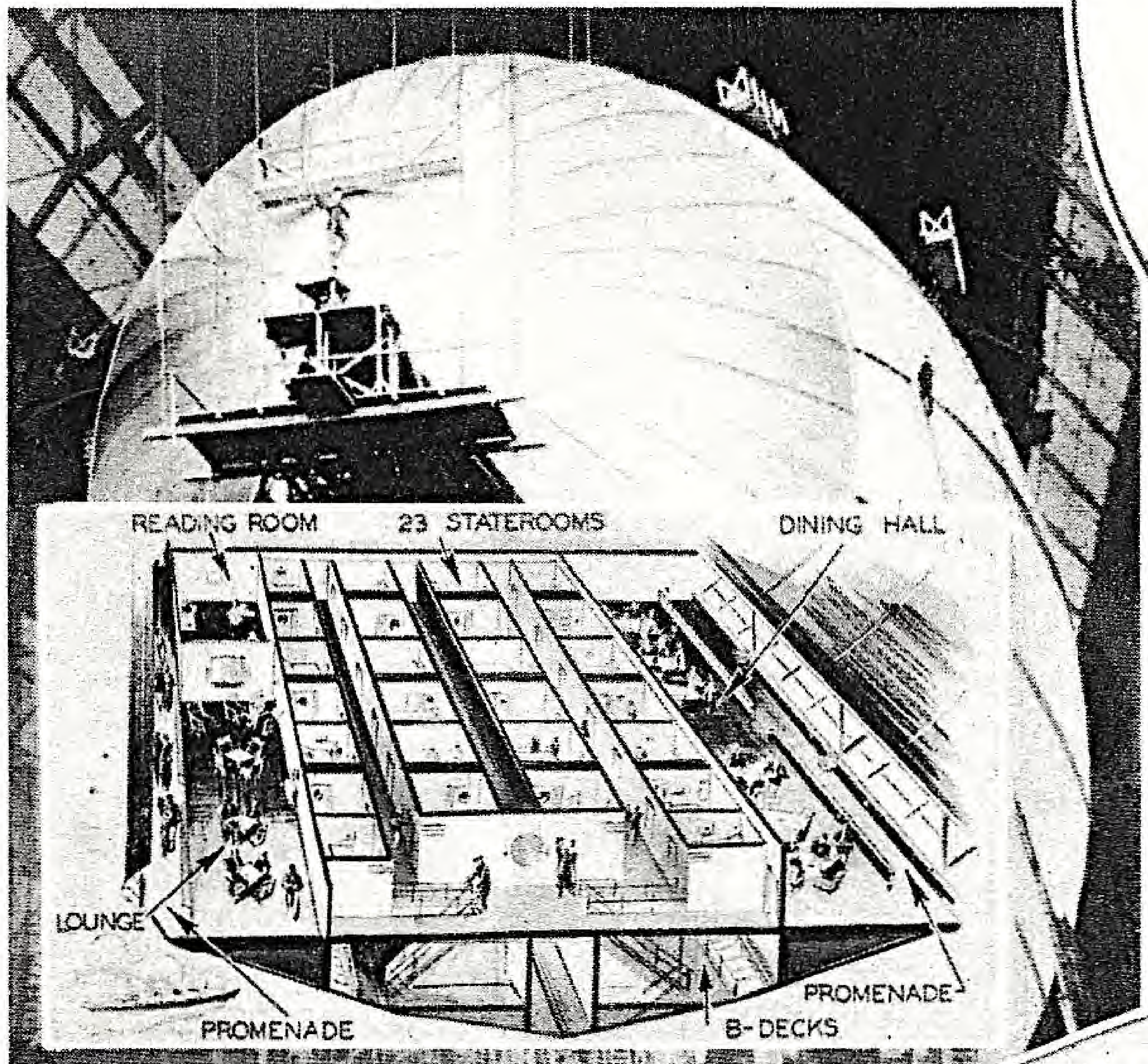
Judging the models were Lowell Thomas, famous newscaster; Gordon Grant, marine artist, and J. J. Wenner, expert on ship models. The trio based their decisions on modeling of the hull, painting of the hull, proportion of the spars, rigging, and proportion of the standing gear.

INSIDE THE WORLD'S *Largest* AIRSHIP

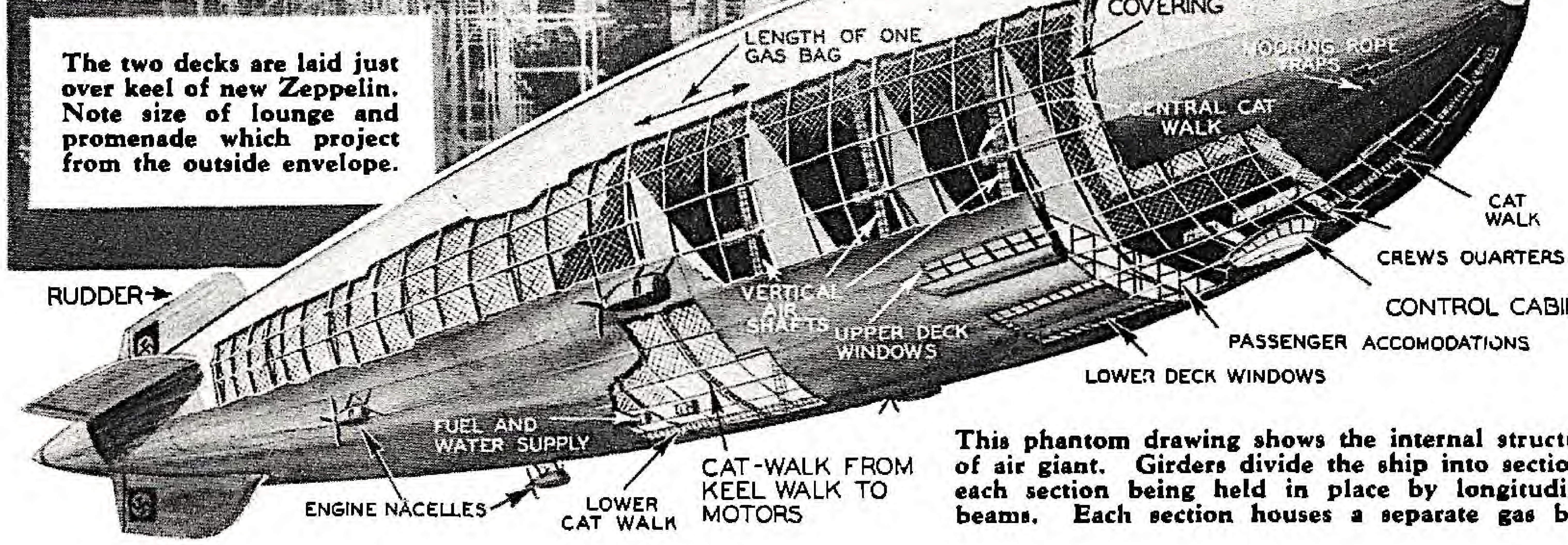
Gliding majestically along the air lanes over Germany, the 800 foot LZ-129 tests her structure and intricate instruments in a shake-down cruise. Note the four banks of windows amidships, behind which lie the passenger accommodations. The two projections mark observation decks.



Above is shown two of the Diesel motor nacelles, each of which has the combined power of a dozen automobiles. The great propellers are 4-bladed.


READING ROOM
23 STATEROOMS
DINING HALL
LOUNGE
PROMENADE
B-DECKS
PROMENADE

The two decks are laid just over keel of new Zeppelin. Note size of lounge and promenade which project from the outside envelope.


WIRE MESH BETWEEN GAS BAG AND OUTER COVERING
LENGTH OF ONE GAS BAG
MOORING ROPE TRAPS
CENTRAL CAT WALK
CAT WALK
CREWS QUARTERS
CONTROL CABIN
PASSENGER ACCOMODATIONS
LOWER DECK WINDOWS
RUDDER
VERTICAL AIR SHAFTS
UPPER DECK WINDOWS
FUEL AND WATER SUPPLY
ENGINE NACELLES
LOWER CAT WALK
CAT-WALK FROM KEEL WALK TO MOTORS

This phantom drawing shows the internal structure of air giant. Girders divide the ship into sections, each section being held in place by longitudinal beams. Each section houses a separate gas bag.

IDENTIFY CARS—WIN IN

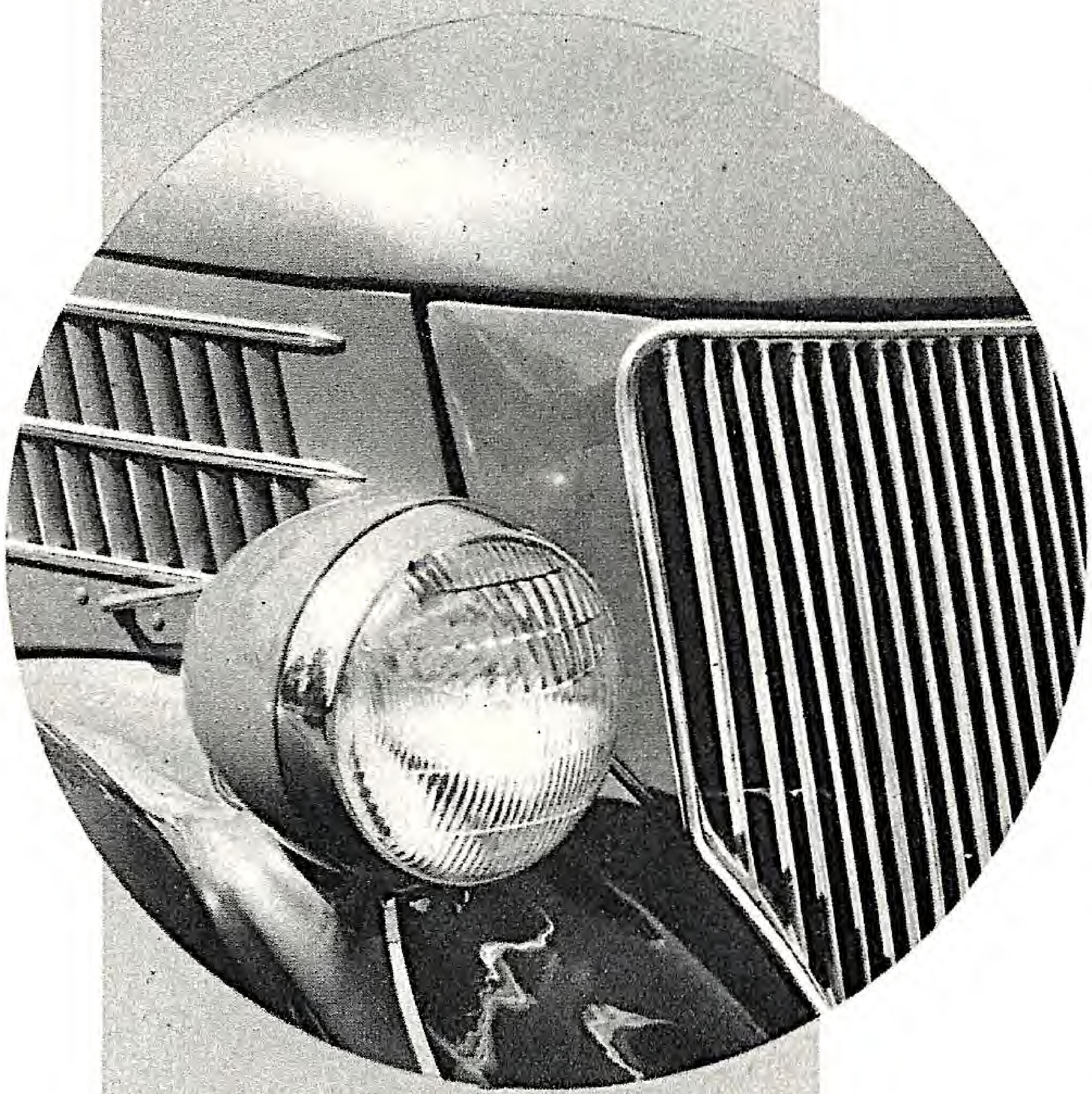
Your last chance to win!

THE four photos on these pages complete the series of 12 in this unique $1,000.00 contest with its 183 cash prizes.

No time is to be wasted if you are to get your entry in to the Automobile Contest Editor by June 1. In the April and May issues of this magazine you will find the preceding eight photographs in the contest. Possibly you have them already indentified. If not, lose no time.

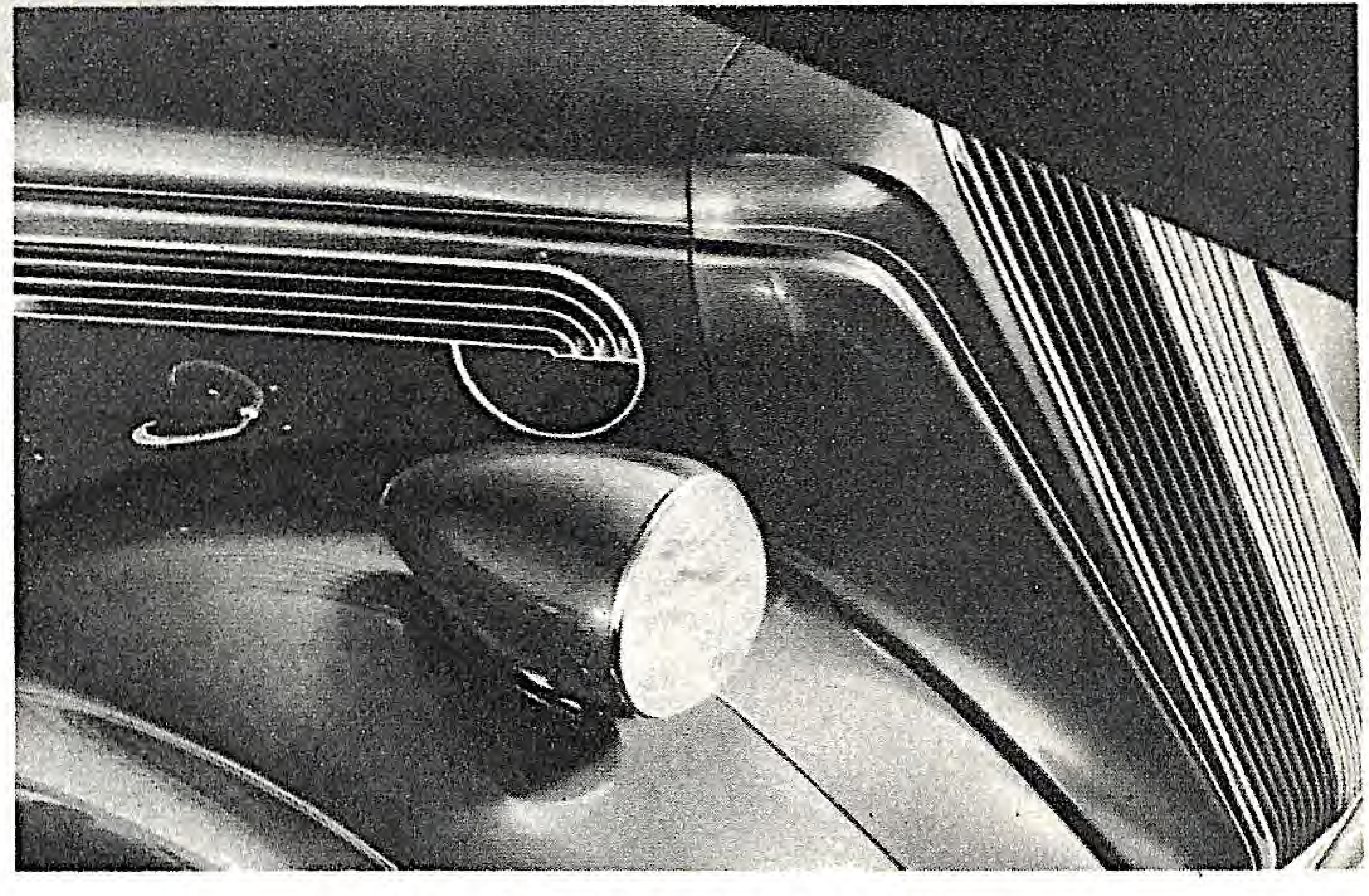
The next step is to write in ten words or less a "Safety Slogan" on some phase of motoring safety. This is highly important as the slogan will be one of the points considered by the judges.

All 12 pictures must be included before the entry is eligible for a prize. After identifying the car from its distinguishing features shown in the photograph, simply write its name in the designated space, clip out the photo and paste it down upon a sheet of paper. Every one has a chance to win.



THE NAME OF THIS CAR IS

Ford ....



THE NAME OF THIS CAR IS

THE QUESTIONS

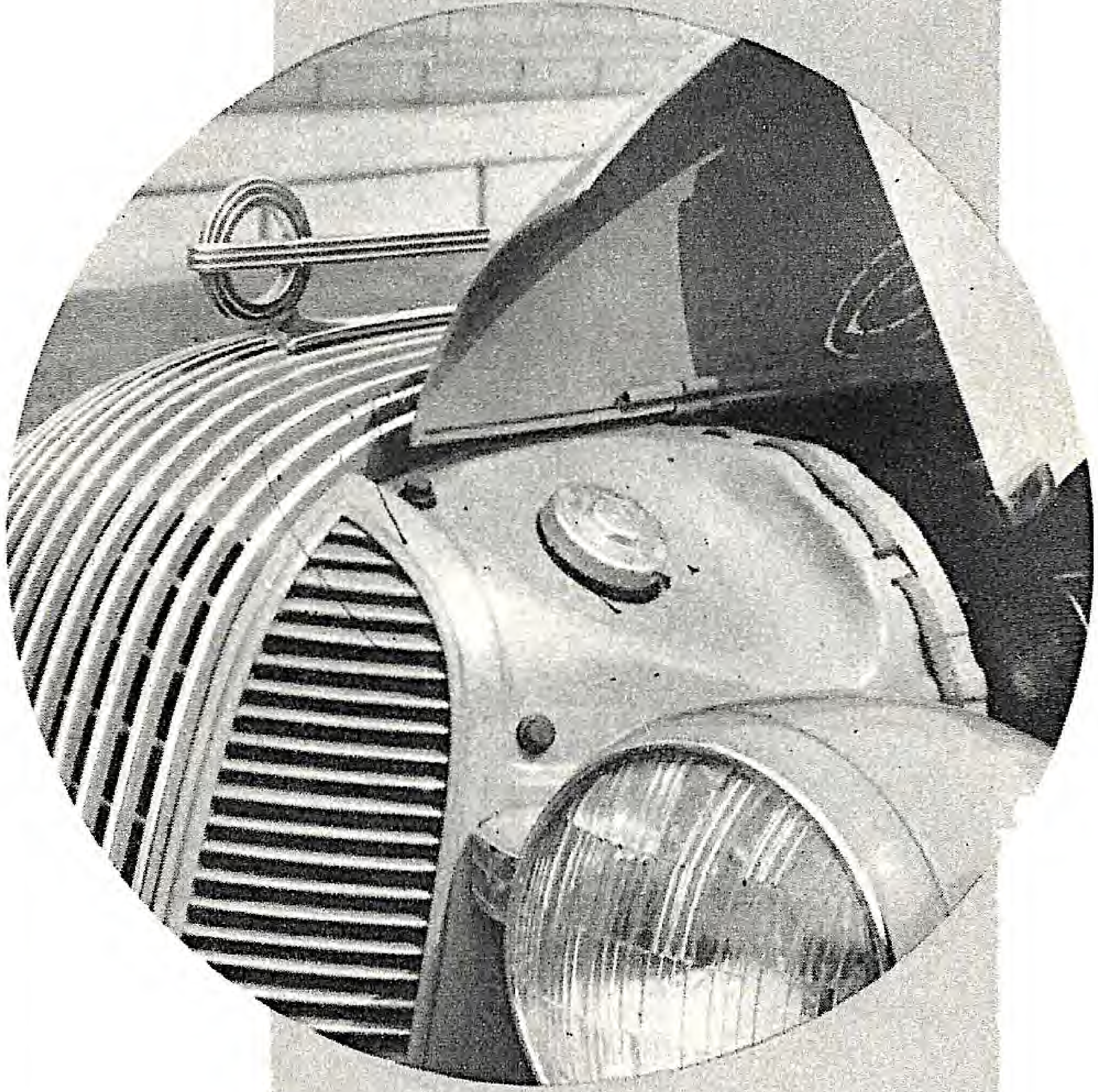
ANSWER THESE QUESTIONS

1. What is your age and occupation? ....
2. Do you own an automobile? ....
   What make? ....
   What year? ....
3. Do you plan to buy a new car? .... When? ....
   What make? ....
4. Approximately how many miles do you travel in your car annually? ....
5. What brand gasoline do you regularly buy? ....
   What oil? ....
   What tires? ....

$1,000.00 Cash Contest

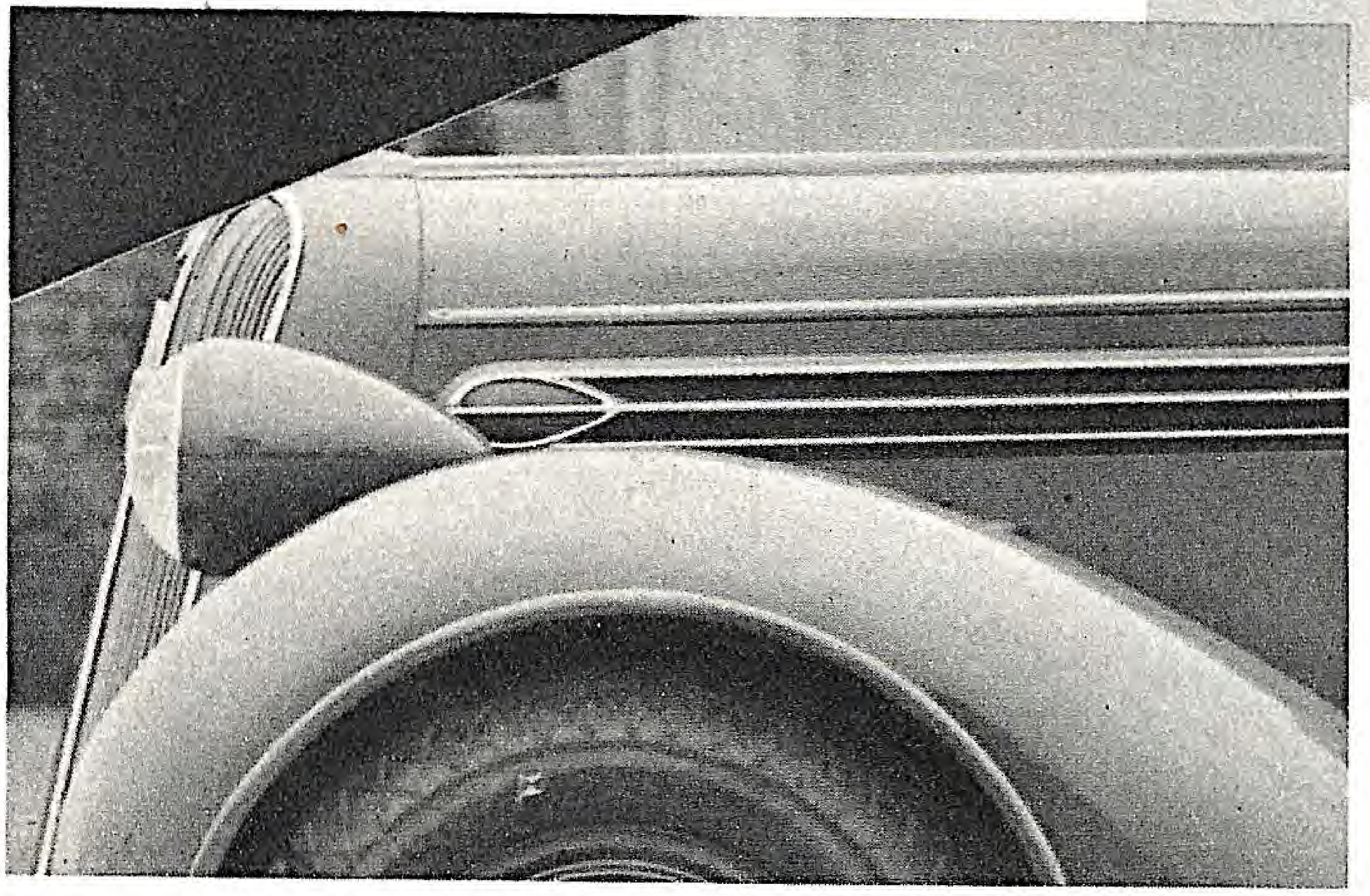
THE RULES

1. Cut out each photograph and in the space below it write the name of the car from which the identifying feature was taken.
2. Answer accompanying questions. Your replies to these questions will not be considered by the judges, but to be eligible each entrant MUST answer the questions.
3. In ten words or less state your "SAFETY SLOGAN." The originality shown in the "SAFETY SLOGAN" WILL BE CONSIDERED by the judges. The "Safety Slogans" are to become the sole property of Modern Mechanix Publishing Co.
4. This contest is open to everyone except employes of Modern Mechanix Publishing Co.
5. You don't have to buy a copy of this magazine or be a subscriber to enter this contest. Recognizable facsimiles of the photographs will be acceptable.
6. Contestants need not submit elaborate entries. Neatness, brevity, and accuracy will be the deciding factors. All 12 photographs must be entered. No entries will be returned.
7. The editors of this magazine will be the judges. Their decisions are final. In case of ties duplicate prizes will be awarded.
8. Mail your entry to the AUTOMOBILE CONTEST EDITOR, Modern Mechanix Publishing Company, Greenwich, Conn. Write your name and address clearly on your entry. To be eligible entries must be postmarked on or before June 1, 1936. Winners will be announced as soon as possible after the close of the contest.



THE NAME OF THIS CAR IS

Pontiac ....



THE NAME OF THIS CAR IS

THE PRIZES

First Prize—	$250.00 IN CASH
Second Prize—	150.00 IN CASH
Third Prize—	100.00 IN CASH
5 Fourth Prizes—	25.00 EACH
10 Fifth Prizes—	10.00 EACH
15 Sixth Prizes—	5.00 EACH
50 Seventh Prizes—	2.00 EACH
100 Eighth Prizes—	1.00 EACH
	$1,000.00
TOTAL—183 PRIZES	IN CASH

Lacquer Process Produces Noiseless Phonograph Records

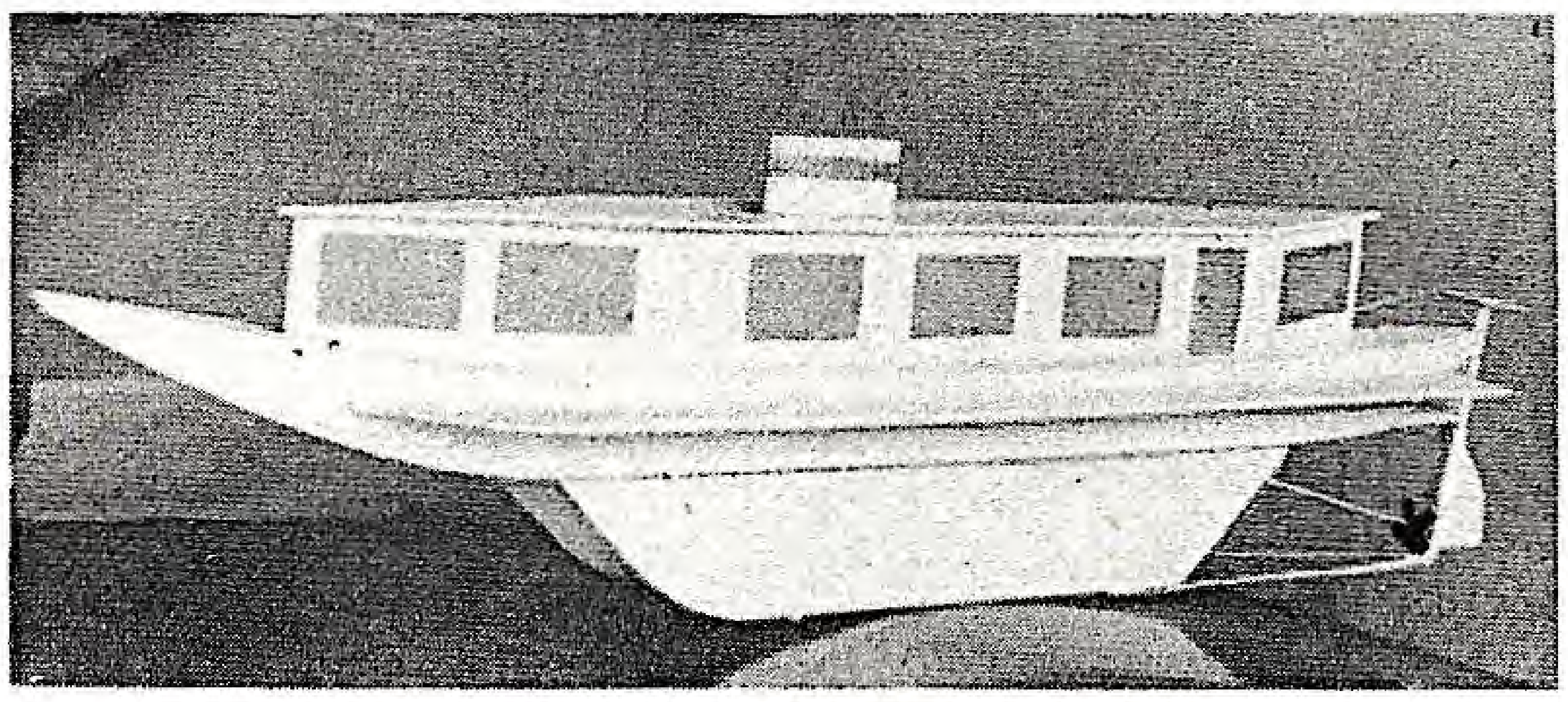
These blank photograph records are coming out of a machine on an endless conveyor belt. The machine has a capacity of about 200 per hour. The records are noiseless and durable.

A MACHINE which makes noiseless phonograph records available for the first time and also permits anyone with home equipment to make the finest type of recordings with ease, has been perfected by Captain Richard Ranger. The new records are now being manufactured in blank form on a commercial scale. In addition, the invention employs a newly discovered synthetic lacquer to obtain records so hard they last indefinitely even after prolonged use.

In order to turn out the blank records in large numbers, the machine utilizes an endless conveyor belt. The operator feeds the highly polished discs into one end of the machine and as they travel along the belt, a nozzle allows the lacquer to flow on the disc with an even thickness. Controlled temperature and humidity dries and hardens the lacquer and the disc comes out of the other end of the machine a completed blank. It has a perfectly clean and uniform surface.

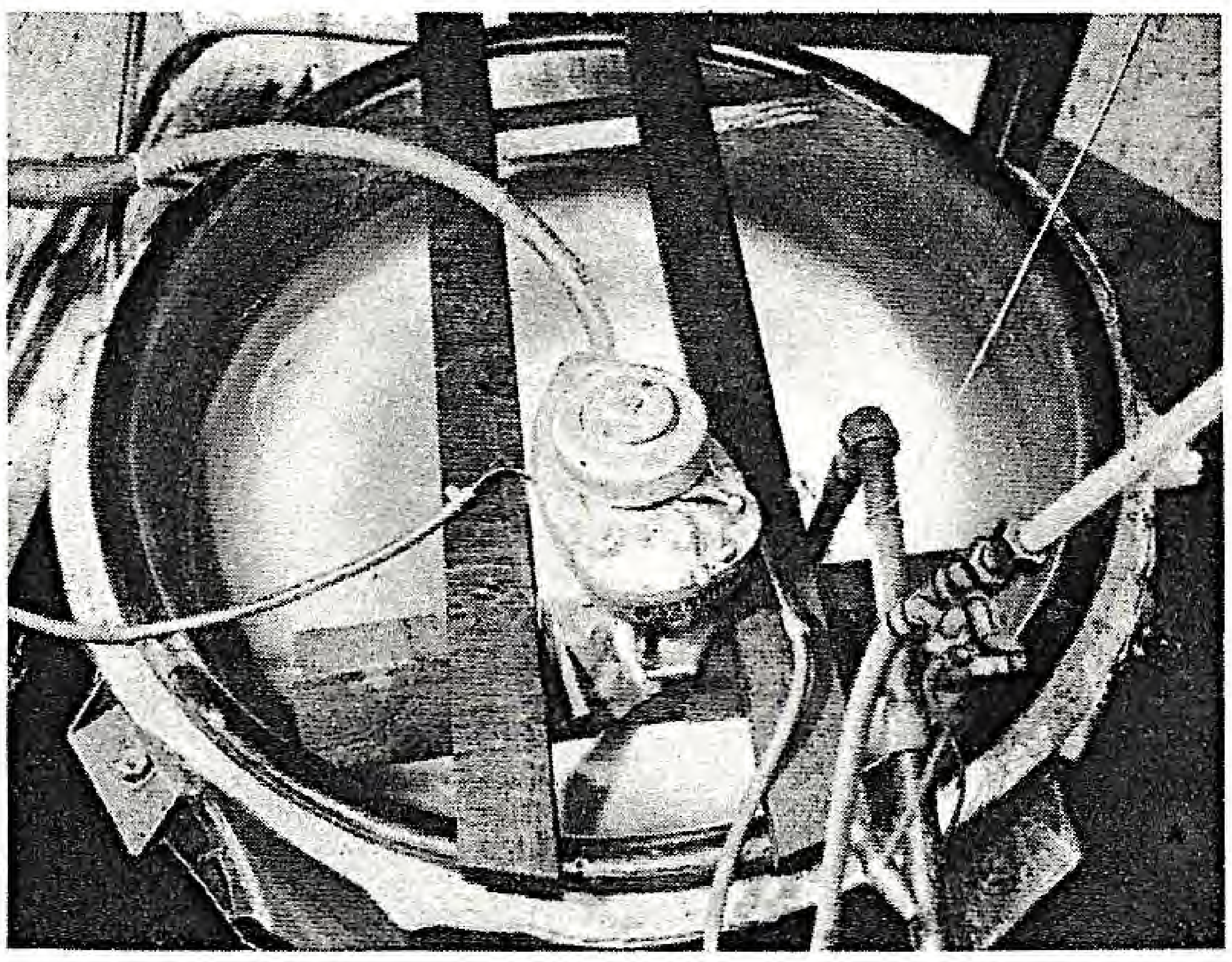
Novel Boat Aims At Speed Mark

A MODEL of a high speed passenger and freight boat expected to make 400 miles an hour has been designed by W. M. Edwards, a Miami inventor. Two high streamlined keels will stabilize the craft. Fitted along the hull, "side planes" with elevators in the rear will control the elevation of the boat above the water. Only the keels, rudder, and propellers will rest in the water when the ship is moving. Thus water resistance will be held to a minimum. Miami engineers estimate that the boat, which will be propelled by a powerful airplane engine, will make the trip from New York to Southampton, England, in 18 hours or from Miami to New York in 6 hours. From stem to stern, boat will measure about 300 feet.



Miami engineers estimate that this unusual boat, when built about 300 feet in length, will travel the route from Miami to New York in 6 hours and from New York to England in 18.

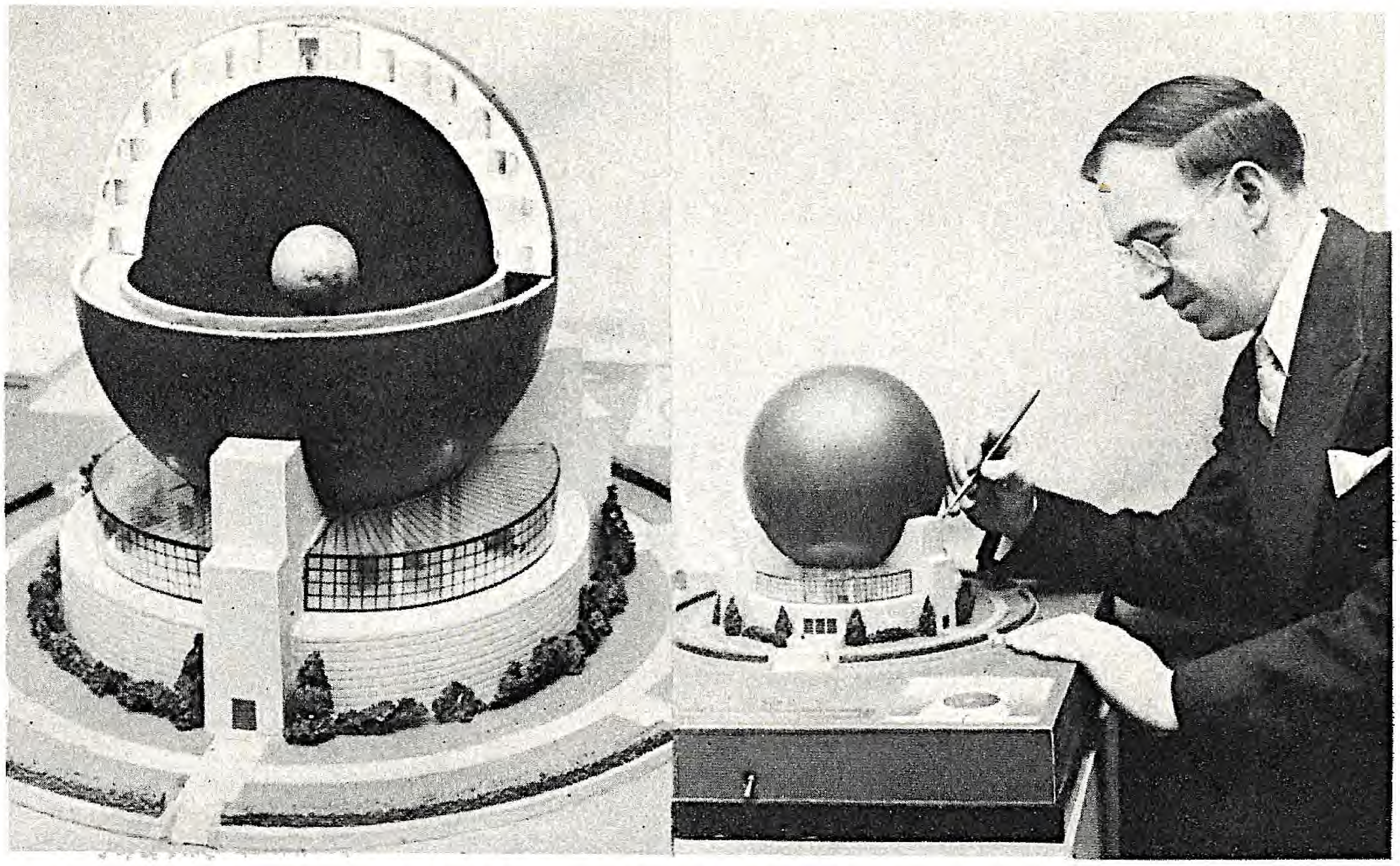
Outboard Motor Used To Mix Oils



This outboard speed motor is being put to a new use—mixing oils in a 250-gal. vat. Motor is operated at about 2,500 r.p.m. and makes about 1,600 propeller revolutions per minute.

THE outboard motor has been put to a new use—mixing oils in a 250-gallon vat. The motor is clamped to the top of the vat. The entire exhaust and water lines are removed and an elbow brazed to a flexible tubing placed at the exhaust chamber of the motor. This is piped to the outside of the building. In place of the water line, 1/8" pipe fittings are substituted in the water jacket and this is connected to city water taps, the discharge running off into a sewer. The motor is operated at about 2,500 r.p.m. and makes about 1,600 propeller revolutions per minute.

Cosmosarium Reveals Earth in Space



This model Cosmosarium, proposed for the next World's Fair, shows us the earth as seen from the skies in contrast to the Planetarium which shows us the skies as seen from the earth. The Cosmosarium achieves the illusion of space by means of a sphere 100 feet in diameter enclosing the globe, as shown in model at left. At the right is the designer, Peter J. Bitterman.

THE Hayden Planetarium in New York City may have a cousin on Long Island if the proposed project for a Cosmosarium at the New World's Fair in 1939 goes through.

The Cosmosarium, a miniature model of which is now on exhibit at the Hayden Planetarium, offers a picture of the earth as it would appear from a point 20,000 miles out in space. Designed by Peter J. Bitterman, it consists of a concrete spherical dome supported by three buttresses. Inside is a second sphere 100 feet in diameter representing cosmic space. Suspended within this inner sphere, is a globe 20 feet in diameter representing the earth revolving on its axis against a starlit background. Between the inner and the outer sphere run two spiralling ramps. Along these ramps at various elevations spectators may behold the earth literally hanging in space.

As the light of the sun reaches the earth from a fixed point and as the earth revolves the spectator by changing his position can see the earth passing through its various phases as we see the moon from the earth. The observation platforms will be equipped with binoculars, making it possible to see the smaller cities on terra firma.

Sound Recording Machine Perfected

OUT of the laboratories of a German firm comes the Magnetophon, a novel instrument for recording sound on narrow strips of film which can be preserved indefinitely. The bands resemble strips of talkie film. The Magnetophon records speeches and conversations, however fast, without difficulty. It uses the simple magnet-sound process. The recording bands are inexpensive.

Using a magnet-sound process, this Magnetophon records sound on narrow bands of film which can be kept on file. Bands are inexpensive and resemble more costly talkie film.

The KENTUCKY DERBY

Catapulting around the first Churchill Downs turn. It takes brains and brawn to swirl a hurtling horse into a sudden gap. Right here is where the Derby is won or lost by the jockey.

WHAT event, lasting only two minutes and a few seconds, could attract 3,000,000 spectators over a period of 62 years, build up a $3,000,000 plant and offer a chief incentive to a half-billion dollar industry?

There's only one—the Kentucky Derby. It is the pathway to the hall of fame for horses, jockeys, trainers and owners, and the final testing laboratory for all great thoroughbreds.

What does it take to win the Derby?

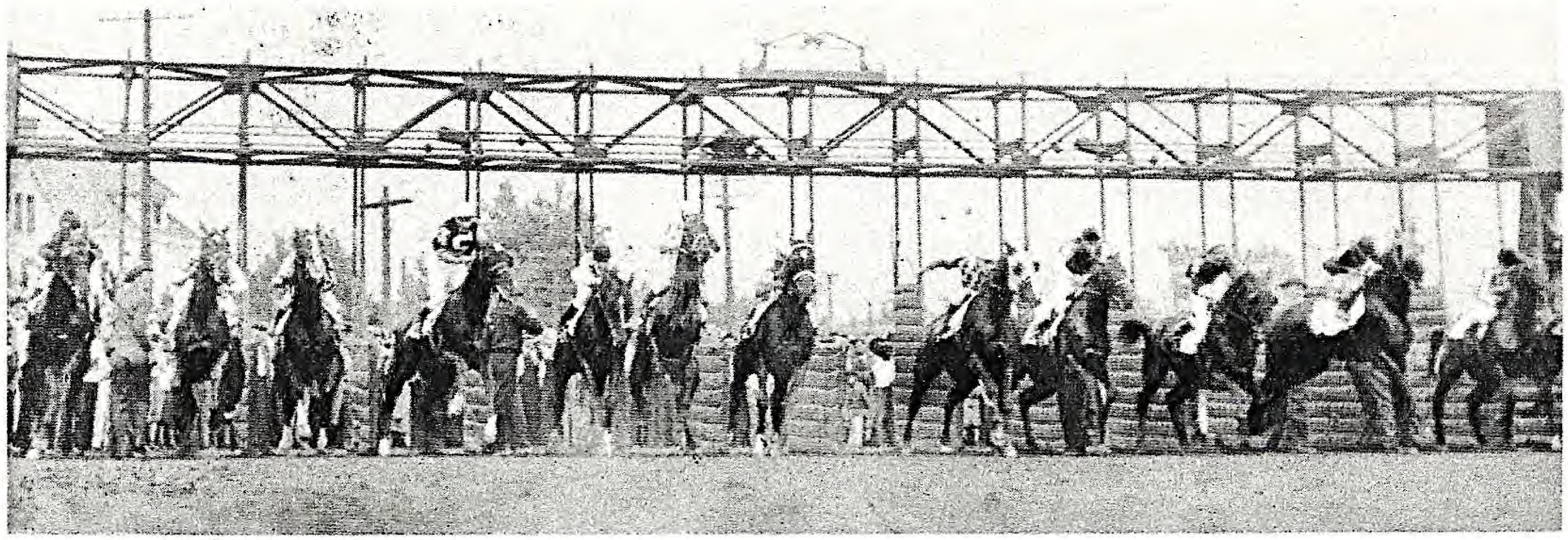
Class!—a champion horse, and a jockey worthy of his mount.

You don't start with the horse. You start with his ancestry. The blood lines of thoroughbreds are as carefully recorded as the lineage of a royal family.

But the chemistry of horseflesh has no fixed rules. The offsprings of champions may fail to inherit the speed, stamina and courage of their sires and dams. A breeder cannot tell until the young horses enter the acid test of racing.

When the renowned Man O' War raced against John P. Grier, another great horse of his day, they matched stride for stride for some distance. Then Man O' War drew ahead and won in an indomitable demonstration of class. John P. Grier never again displayed the same greatness he had shown before meeting Man O' War. The defeat took something out of him. Horsemen call it "being looked in the eye."

Jockeys play an important part in the way horses run, and here again psychology is a



A million dollars in horseflesh is led into the starting gate and, after an age-long wait in which fractious thoroughbreds are quieted, comes the starter's bell and the excited roar of thousands of spectators—They're Off! In the scramble for rail position anything can happen, and does. The dreams and fortunes of a lifetime are tied up in the ace of thrills pictured above.

Testing Laboratory of *Super-Horses*

By COL. MATT J. WINN
(President American Turf Association)
As Told To Ollie M. James

Grandest Kentucky Colonel of them all—Col. Matt J. Winn. From a tree in the Churchill Downs infield, he saw the first Derby run in 1875. Then, 27 years later, he became the big boss, and set himself to make the Kentucky Derby internationally famous. This earned him the title of "Father of the Kentucky Derby." Col. Winn is president of the American Turf Association.

With the rising sun come stop watches and the Derby Hope to breeze through stiff workouts. Note how the jockey literally "perches" in the short stirrups.

potent factor. Experience has shown that horses will run better for some jockeys than for others, although outwardly there may be no difference in the skill of the riders. An outstanding jockey has an emotional kinship with his mount.

The good jockey knows his horse, knows the pace he likes best, how much energy he can expend and have enough left for the stretch.

It's the jockey's job to handle his horse like a racing driver handles his car, making use of speed where speed is needed, and conserving time and ground. But the jockey rides a high-strung animal of almost human temperament, not an enduring metal machine. He must have a good "seat," poised on the horse's withers, or shoulders, balanced in tune with the horse's stride. He must have a "clock in his head," to tick off the flying seconds against the rataplan of hoofs.

Every foot of ground in a race is important, but the start is especially so. When the tape flies up and the bell rings, there's always a scramble for the position next to the rail.

The horse away in front, on the rail, has the advantage. To pass him, the other horses must run around. That isn't much of a handicap on the straight stretches, but on the curves—and half a race may be around the

[*Continued on page* 132]

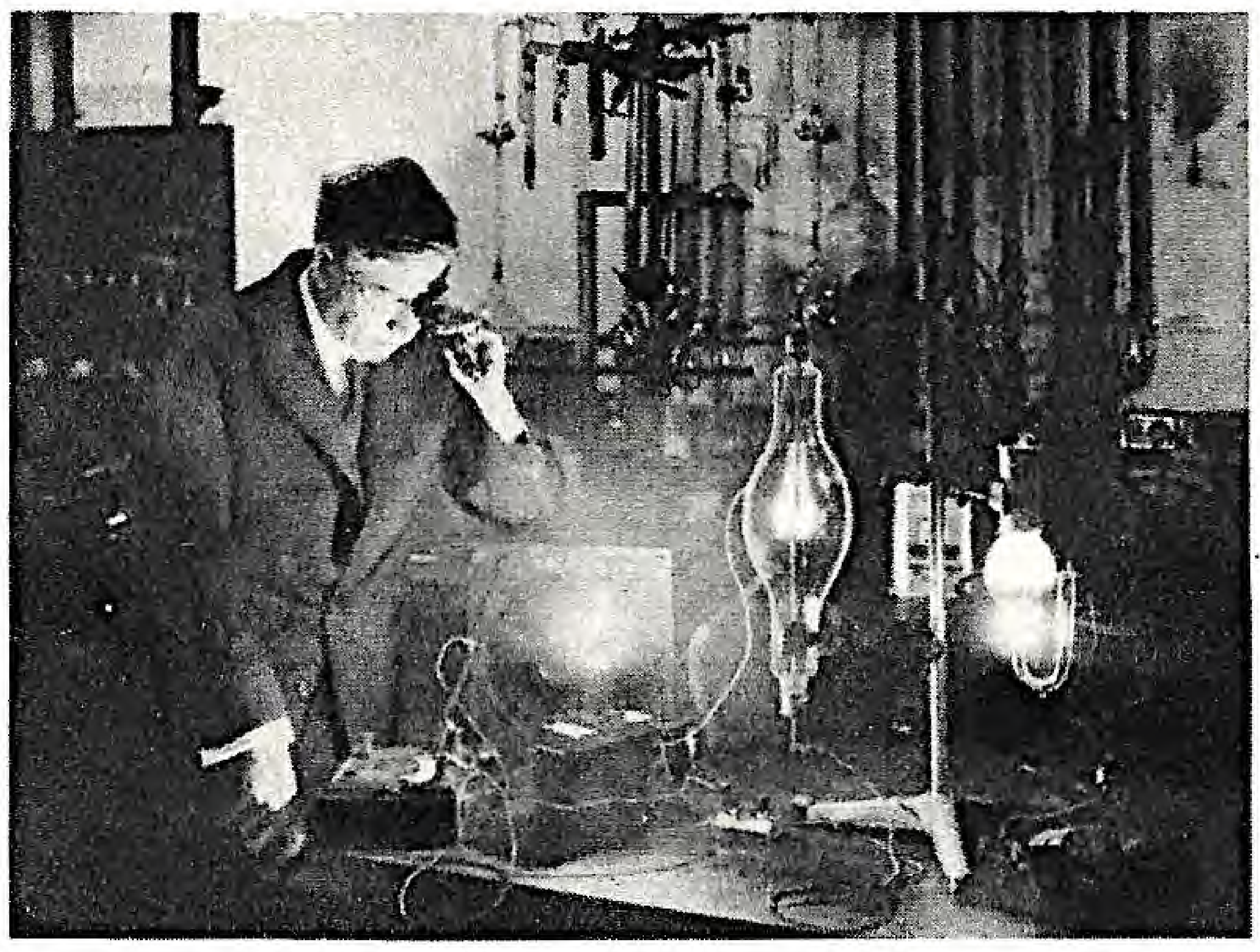
Tensile Strength Machine Forces Molecules To Settle

A NEW tensile strength machine, operating on the same basic principle of centrifugal force as the old fashioned cream separator, but so powerful that molecules and sub-microscopic particles can be forced to settle in their solutions, has been installed in a large experimental station at Wilmington, Del.

The Svedberg professor of chemistry at Upsala University, Sweden, and J. B. Nichols, former student of Professor Svedberg, are the co-inventors of the "ultracentrifuge."

Hydraulic cylinders attached to a pressure gauge at the side of the centrifugal machine record the pressure. A geared pulley arrangement, operated by hand, lowers the massive steel chamber.

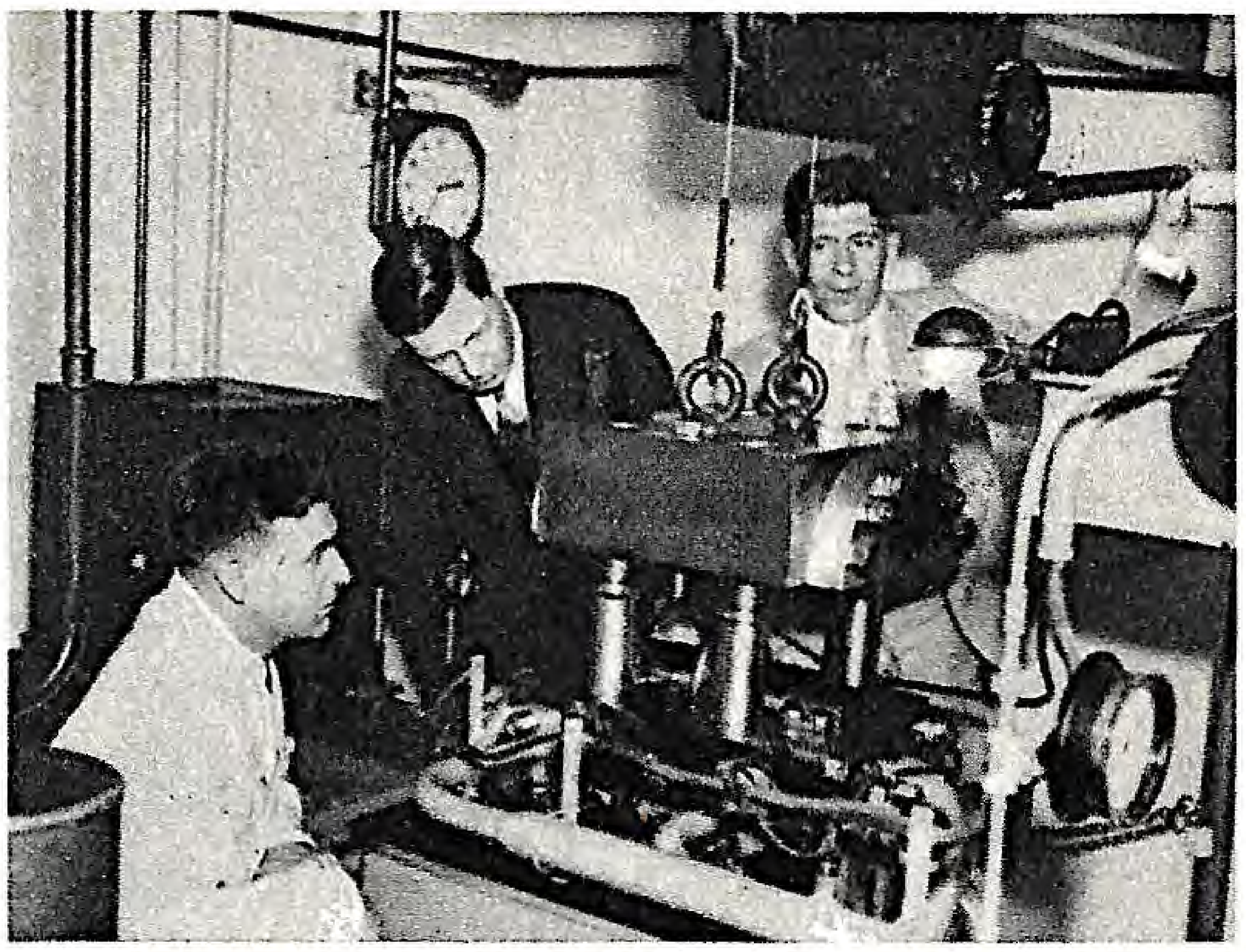
Mercury Light Projects Sun Rays



This new mercury arc light brings mankind to within an arm's reach of a practical, artificial sun. Increasing amounts of electrical energy are shot through metallic mercury to light arc.

A NEW mercury arc light, the 20th century analogy of the lighting method used by Sir Humphrey Davy in 1835, has been developed by eastern research scientists. The arc light brings man a step nearer to a light source that duplicates the light of the sun.

Obtained by shooting increasing amounts of electrical energy through a vapor of metallic mercury, the light operates at unusually high efficiency converting so much of its electrical food into light that in time it may triple the amount of light for the same electrical consumption. In a recent test one mercury arc light mounted in the dome of a theater auditorium, illuminated the entire theater. The light of this brilliant mercury arc is almost identical to the spectrum of sunlight.



Physicists engaged in research on this new tensile strength machine, lower the massive steel case enclosing a rotor. The machine breaks down sub-microscopic particles into solution.

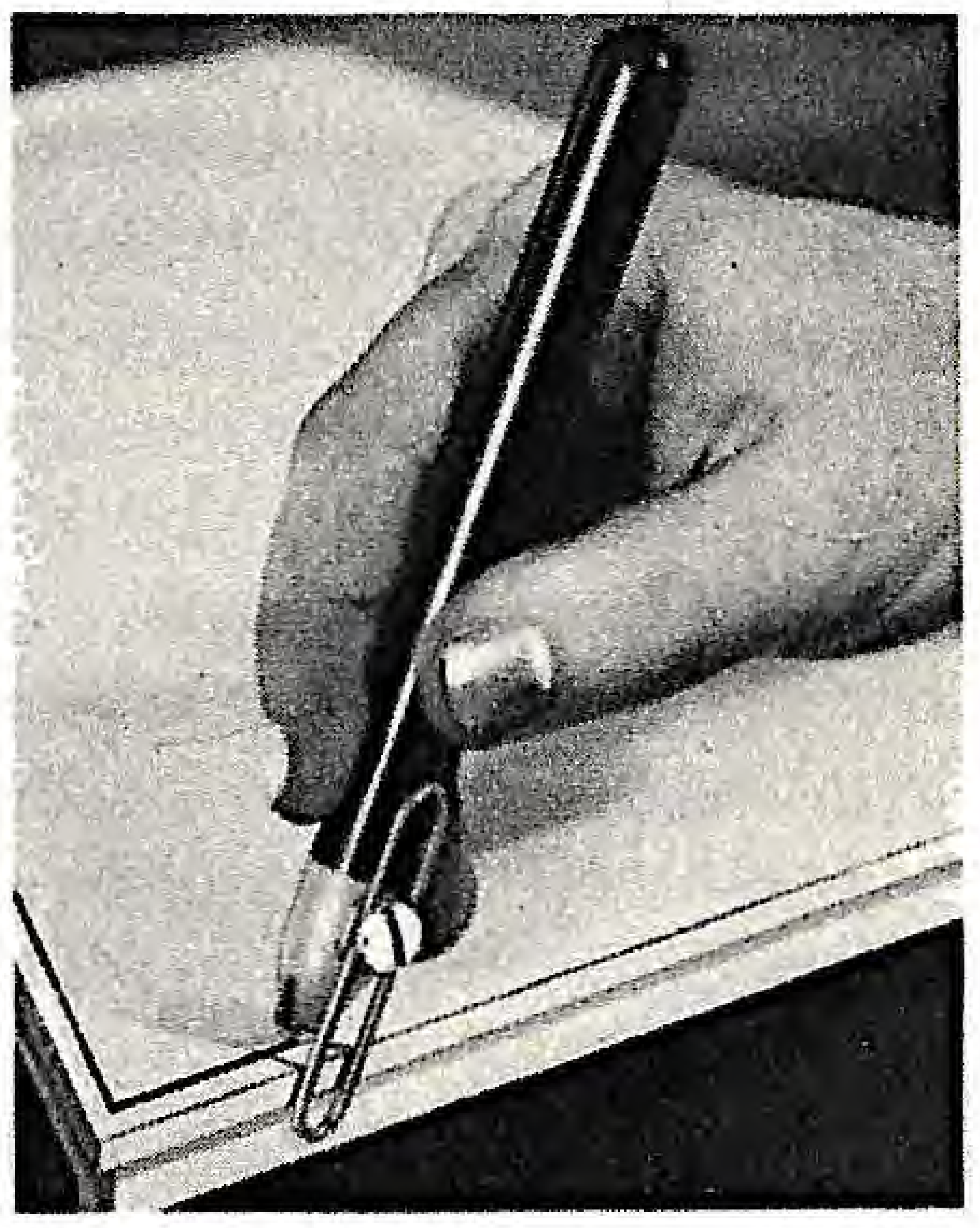
Dust Specks Make Debut In Movies

THE first falling dust speck to break into the movies has been reported by the California Institute of Technology. The dust particle was caught by a motion picture camera equipped with an ultramicroscope which takes pictures at exact time intervals. The movie showed that the particle fell at a constant rate of speed instead of faster and faster. The ultramicroscope's sensitive eye disputes theory of falling bodies accepted by scientists.

Paint Striper Yields Smooth Line

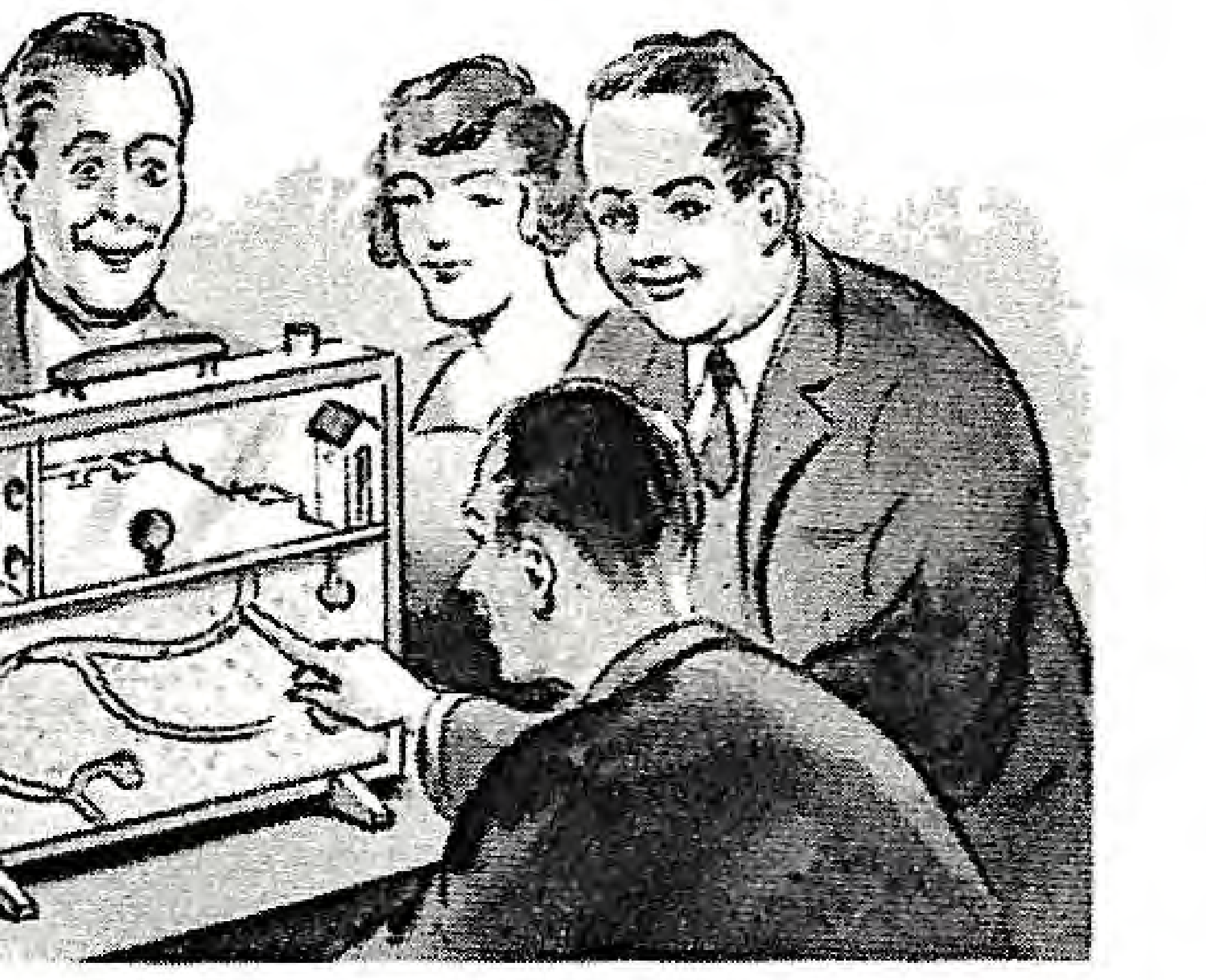
A PAINT striper, used like an ordinary pen and suitable for striping automobiles and furniture has been brought out in the Middle West.

The paint striper is equipped with an adjustable gauge. After adjustment and after the striper has been filled with paint the striper needs only to be rolled over the surface of an article. The paint flows neatly, smoothly, and with uniform thickness through the use of a specially knurled wheel. The instrument has been found to be extremely useful for applying a finished touch to home paint jobs.

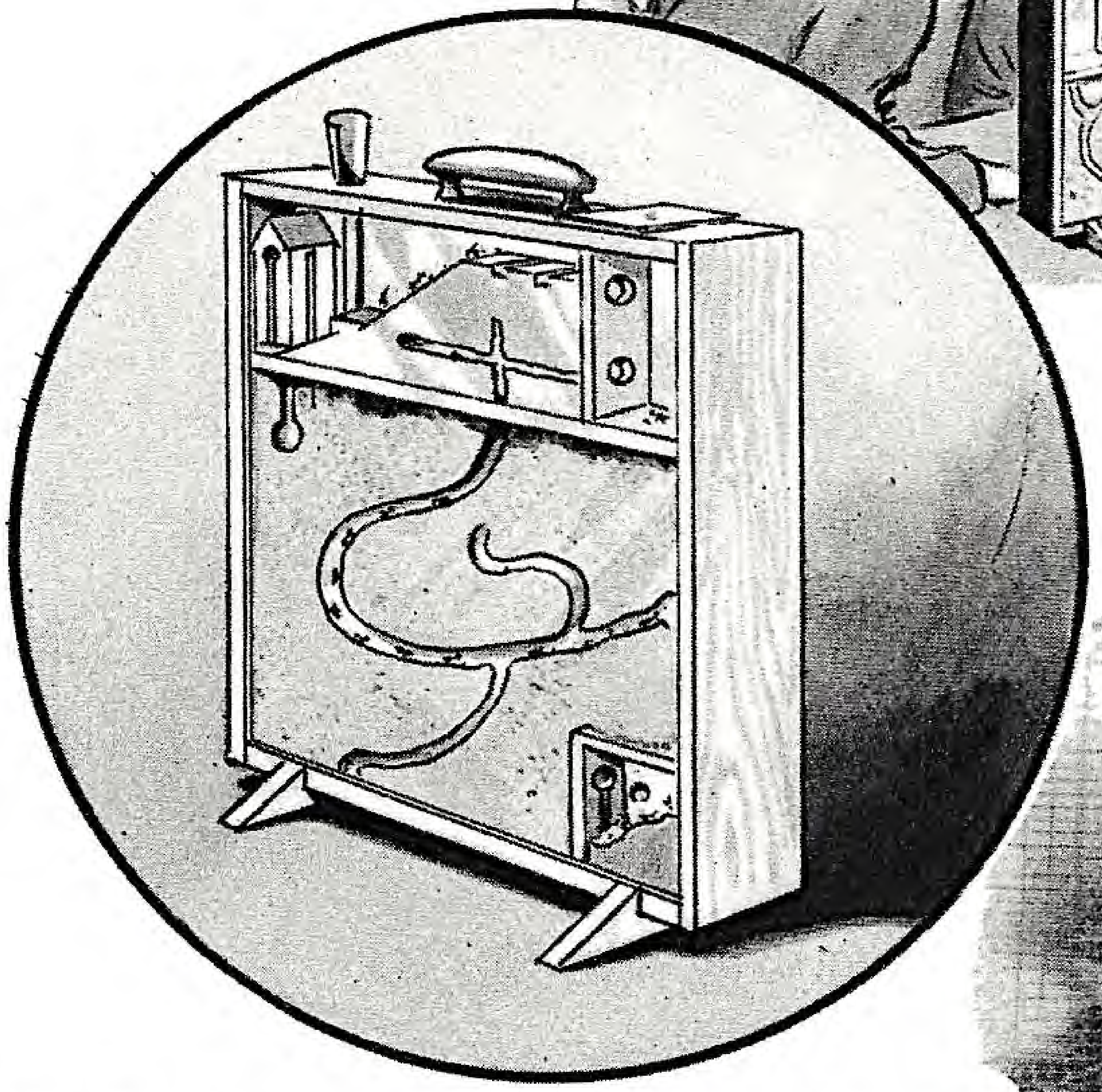


Yielding a neat, even, smooth line, this paint striper can be used to lend a decorative touch to automobiles, furniture, and sign posts.

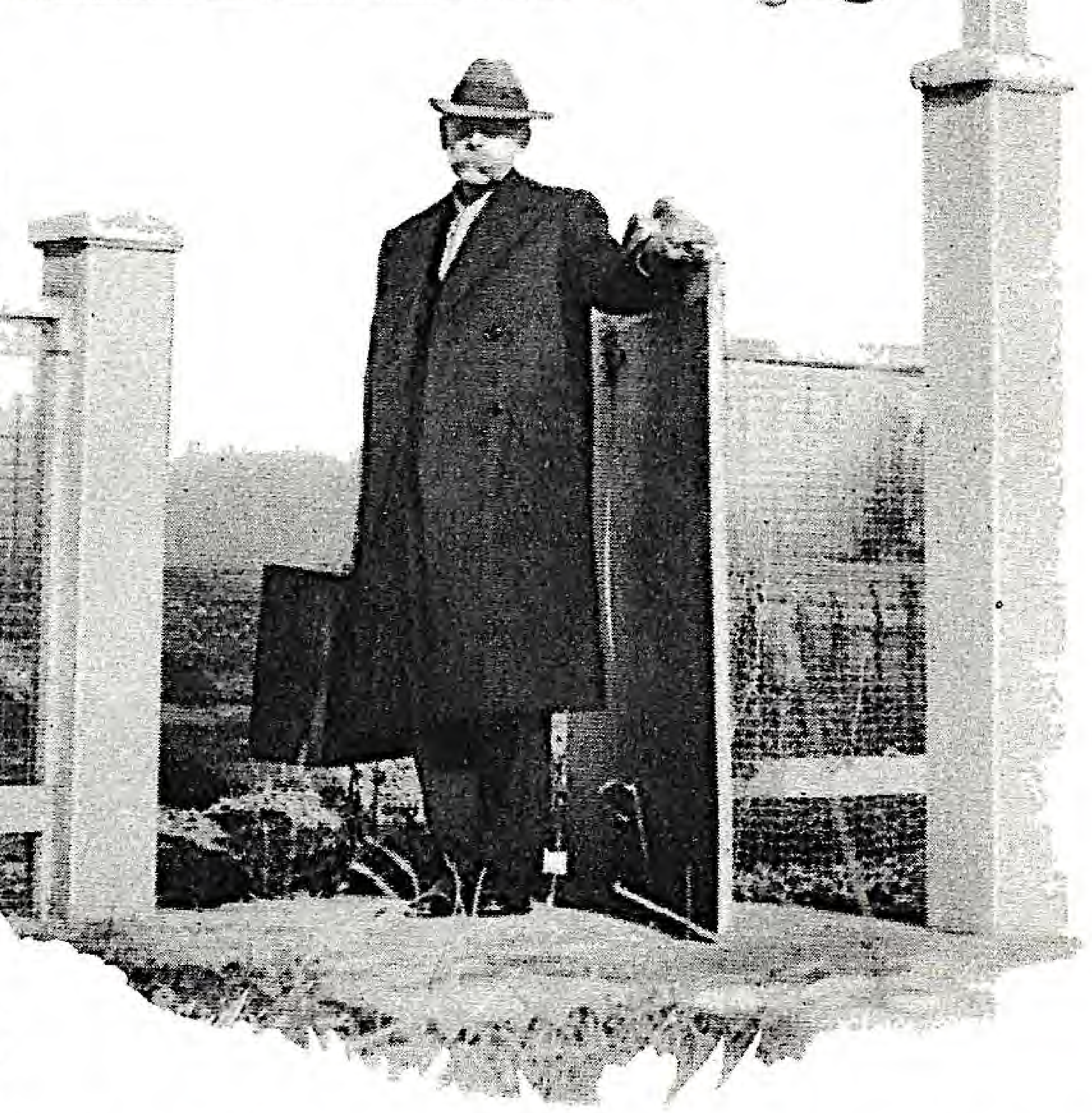
ANT PALACES Create NEW Pastime



Ants in glass palaces are furnishing a new form of instructive entertainment. Their activities never cease.



Here is a view of one of the ant palaces which is furnishing observers with a cross section of insect life. All activity of the little creatures is visible through the glass panels which comprise the sides.



Mr. F. E. Austin, retired mechanics and engineering instructor, is the inventor of the ant palaces. His idea originated when he observed ants frantically restoring a broken home.

THOUGH it sounds like something out of "Alice in Wonderland," the ant palace is a very real contrivance that sells for five dollars, and sells very rapidly at that. Strange things have been built in the name of entertainment, but seldom anything quite as novel and ingenious as these glazed-in ant apartments with both northern and southern exposure.

Ant palaces do for ants what glass bowls do for goldfish. They are an artificial home in which these most fascinating members of the insect world live, work, mate and do battle. Made up of two glass panels about twelve by eighteen inches in size and held approximately an inch apart by a wooden frame, the palaces contain a plentiful quantity of choice New Hampshire dirt in which the tiny inmates set up housekeeping. Stripped of all privacy, the ants go through their complicated daily routine in full view of the spectator. The result is so interesting that ant palaces are to be found in drawing-rooms all over the country.

Mr. F. E. Austin, who used to teach mechanics and engineering at the Thayer School of Engineering, retired with the intention of living in scholarly quietness in his New Hampshire home. The depression changed all that, so Mr. Austin began teaching manual training. A student one day showed him an overturned nest of ants, and it immediately occurred to the alert Mr. Austin that a cross-section of the teeming home life of the ant should be interesting to everybody.

The next day Mr. Austin built his first ant palace—a simple combination of his knowledge of biology and his skill with tools. Before long he was selling them to schools and museums for educational purposes, and to convalescents whose hours weighed heavily. But soon thoroughly healthy people began to buy them for the sheer entertainment they furnished. Mr. Austin took out a patent on his idea, and continued to carry on his small but steady local business.

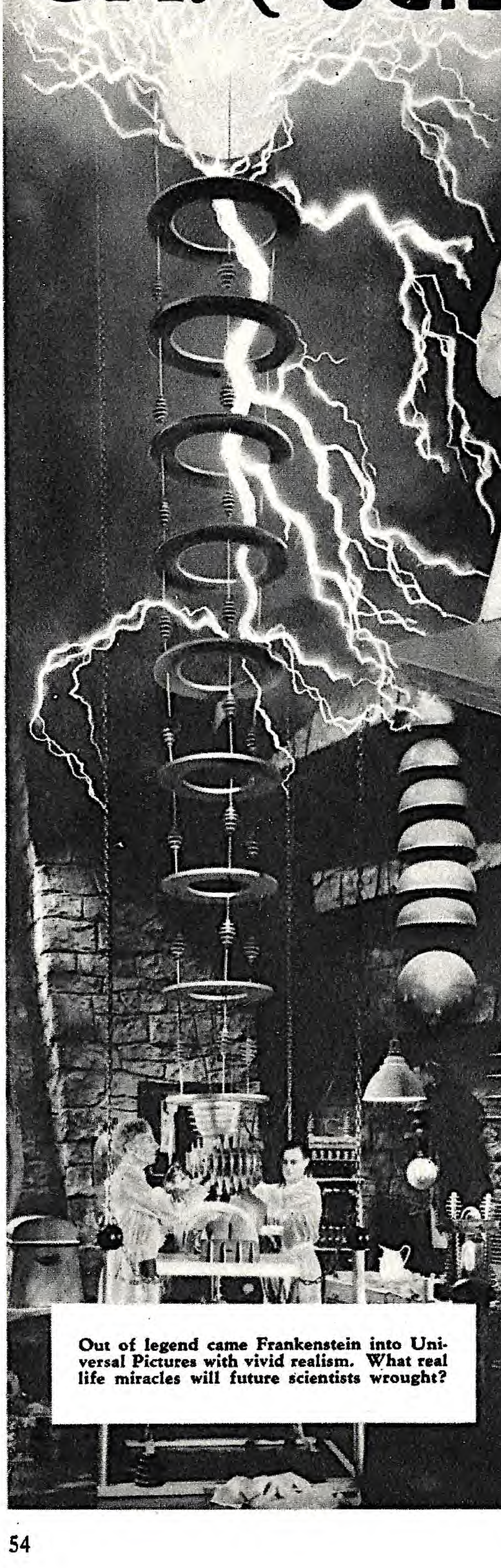
Last fall Mr. A. J. Russell, a New York

[*Continued on page* 120]

CAN SCIENCE MAKE

by DONALD GRAY

Above is a science achievement that permits doctors to measure life expectancy through the super-eye camera. Thus eye vein changes will prescribe treatment to prevent ruptures and fatal blood vessel breaks.



Out of legend came Frankenstein into Universal Pictures with vivid realism. What real life miracles will future scientists wrought?

YOUR great-great-great-great-great grandchildren may live for a thousand years!

Let us assume that it is the year 2136 and this far-off descendant of yours has reached the age of twenty-five. He summons a scientist and says:

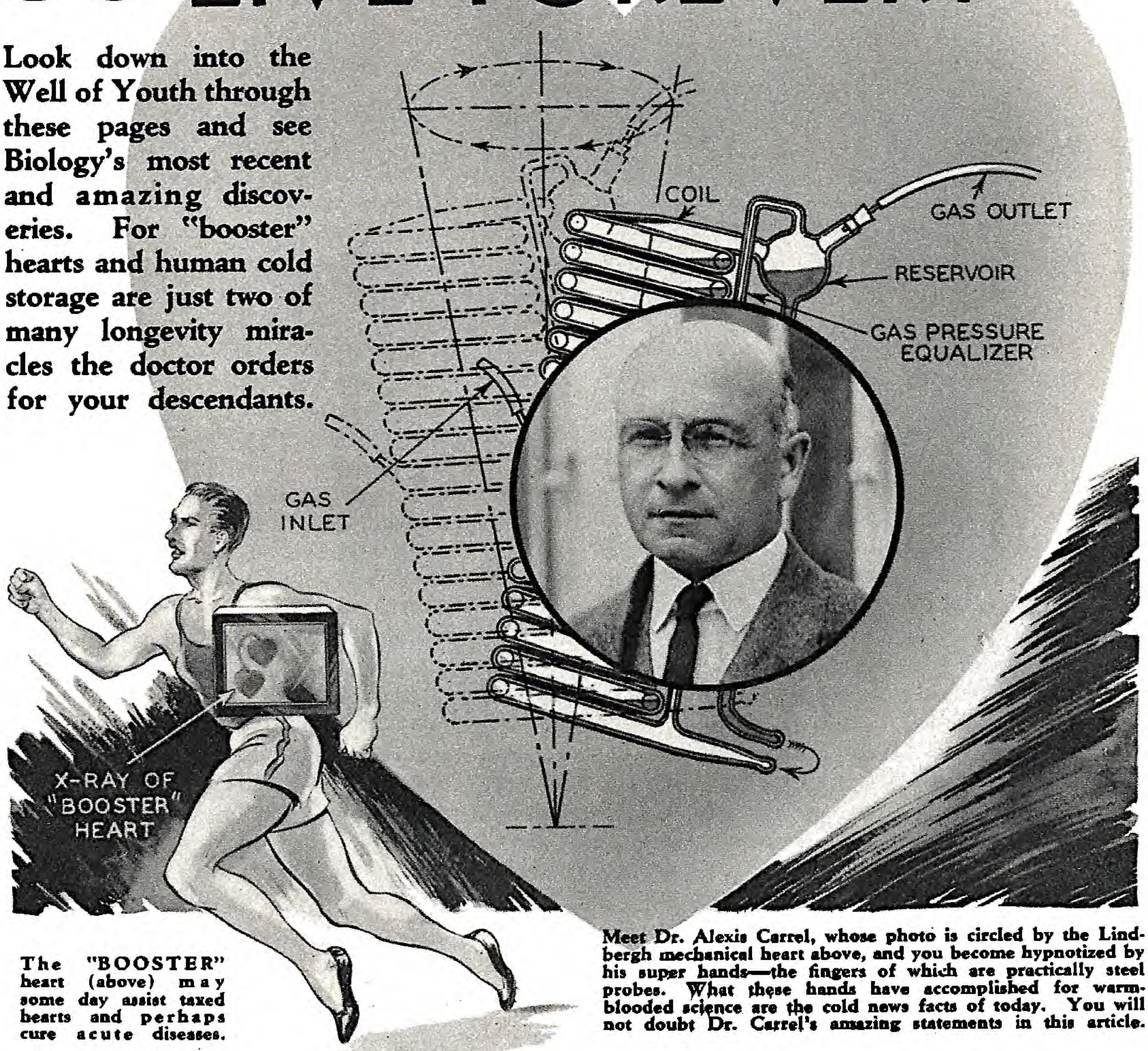
"I have decided to retire from the world for a while. Put me in a storage vault and leave orders that I be restored to the world of living men one hundred years from today."

The scientist obeys matter-of-factly; such orders are mere routine. By medical means the subject is placed in a state of suspended animation or latent life, and stored away in a chamber with hundreds of other men and women who are neither alive nor dead. Their bodies neither grow nor age nor decay.

When 2236 rolls around, the subject is awakened easily, and although a century has passed, he is still a vigorous young man of

US LIVE FOREVER?

Look down into the Well of Youth through these pages and see Biology's most recent and amazing discoveries. For "booster" hearts and human cold storage are just two of many longevity miracles the doctor orders for your descendants.



The "BOOSTER" heart (above) may some day assist taxed hearts and perhaps cure acute diseases.

Meet Dr. Alexis Carrel, whose photo is circled by the Lindbergh mechanical heart above, and you become hypnotized by his super hands—the fingers of which are practically steel probes. What these hands have accomplished for warm-blooded science are the cold news facts of today. You will not doubt Dr. Carrel's amazing statements in this article.

twenty-five, ready to spend the rest of his years as he chooses or to return occasionally to his Rip Van Winkle sleep if he so desires.

Fantastic? Extremely so. Yet entirely with in the range of scientific possibility!

The suggestion does not come from a wild-eyed visionary, but from no less a world-famed authority than Dr. Alexis Carrel of the Rockefeller Institute for Medical Research.

Dr. Carrel is famous for some astounding biological experiments. He has, for instance, kept a strain of cells from a chicken's heart alive and thriving in a glass container for twenty years. Recently, with Col. Charles A. Lindbergh, he has developed the Lindbergh "life chamber" which is a robot heart of glass in which extirpated organs live and behave very much as they do in the body.

So when Dr. Carrel predicts that in remote centuries human life may be immeasurably extended, the statement comes from the one man in the world who is best qualified to make it.

There are several possible means of extending the life span which Dr. Carrel sees open to science. Rejuvenation, or the surgical grafting of young glands into an aging individual, we have only begun to understand. In ages to come such operations may be commonplace, and a fifty-year-old man, spending a day or two in a hospital, may emerge with his age-calendar set back thirty years.

It is quite possible, too, Dr. Carrel believes, that men and women may be enabled to live on vigorously to incredible age simply through a better understanding of the mysteries of the human body. Even today we have centenarians in every land who prove that our bodies hold secrets of vitality we do not begin to suspect.

The conquering of age is not to be looked for in our own generation, or for many that will follow it. Dr. Carrel's view of the future is an extremely long distance one, and he is careful to make it clear that he does not predict human immortality.

"There is no hope of ever conquering old age and death," he says. "But it is quite probable that the maximum duration of life can be more or less considerably extended."

Fundamentally, of course, his predictions are no more unbelievable than Roger Bacon's prophecy of the airplane in the fifteenth century. Dr. Carrel, like Bacon, is looking many centuries into the future.

Most intriguing to the imagination is the suspended animation, human storage-vault idea which Dr. Carrel describes as follows:

"Some individuals could be put in storage for long periods of time, brought back to normal existence for other periods, and permitted in this manner to exist for several centuries."

There is sound scientific logic behind the statement. Certain small animals, notably the anthropoids, have been completely dried out in the laboratory. By all normal standards they are dead; their metabolism, or generation of internal heat, ceases. But moisten them with a few drops of water! Here is black magic indeed, for the "dead" animal comes to life! Actually it has not been dead, but in a state of latent life. How can the phenomenon be explained? No man knows the answer—and no one is wise enough to deny that science may not give man a similar power.

Nature herself is the first great master of suspended animation. We see a form of it in the bear, the dormouse, and other mammals which retire to dens at the onset of winter and there spend many months without food or apparent means of sustaining life. Science has a name for it—hibernation—but no answer other than conjecture to the question: "What mysterious force keeps the machinery going?"

Partly dried organs—"dead" in the popular sense—have been grafted into guinea pigs by Alexander Lipschutz, and strangely enough

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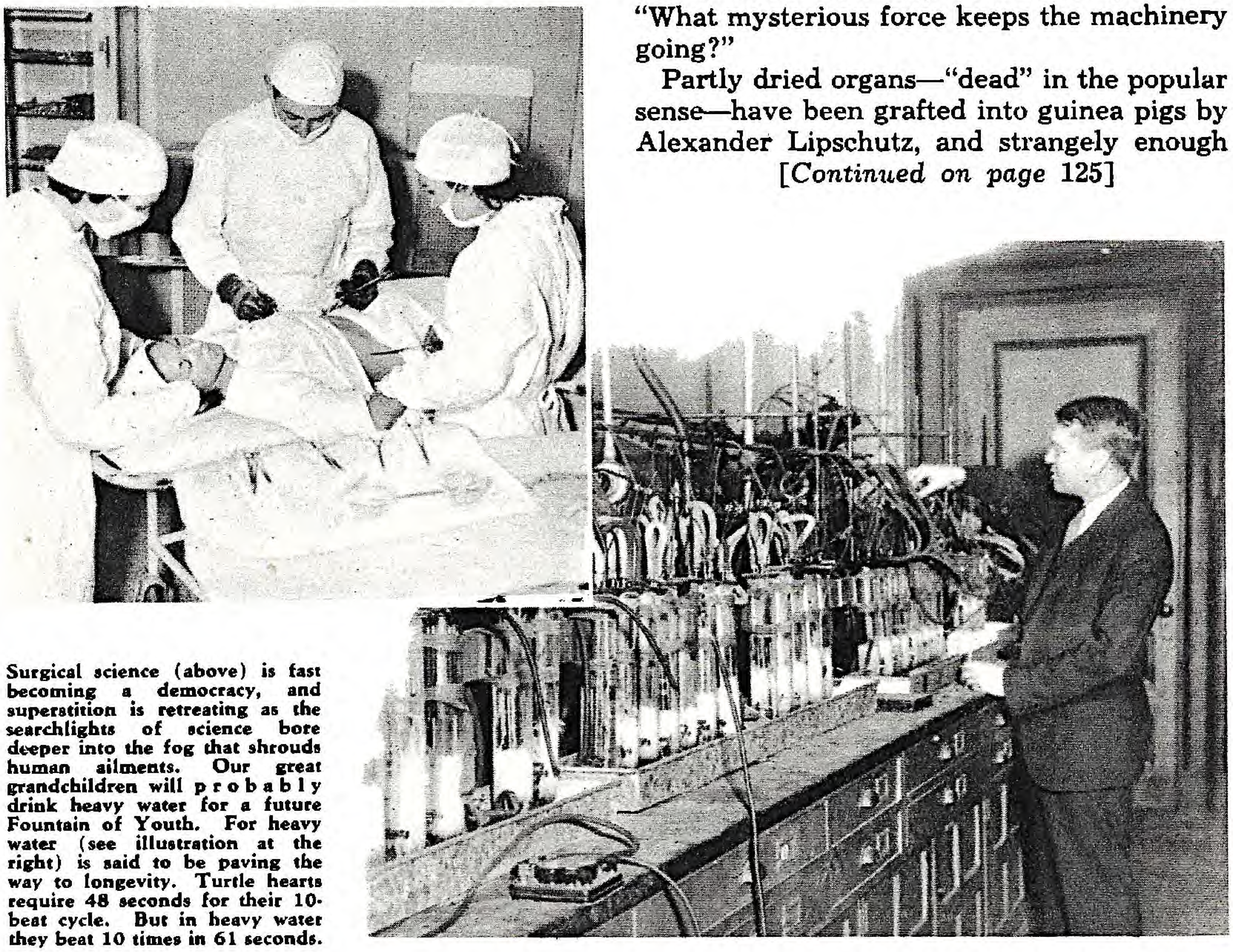
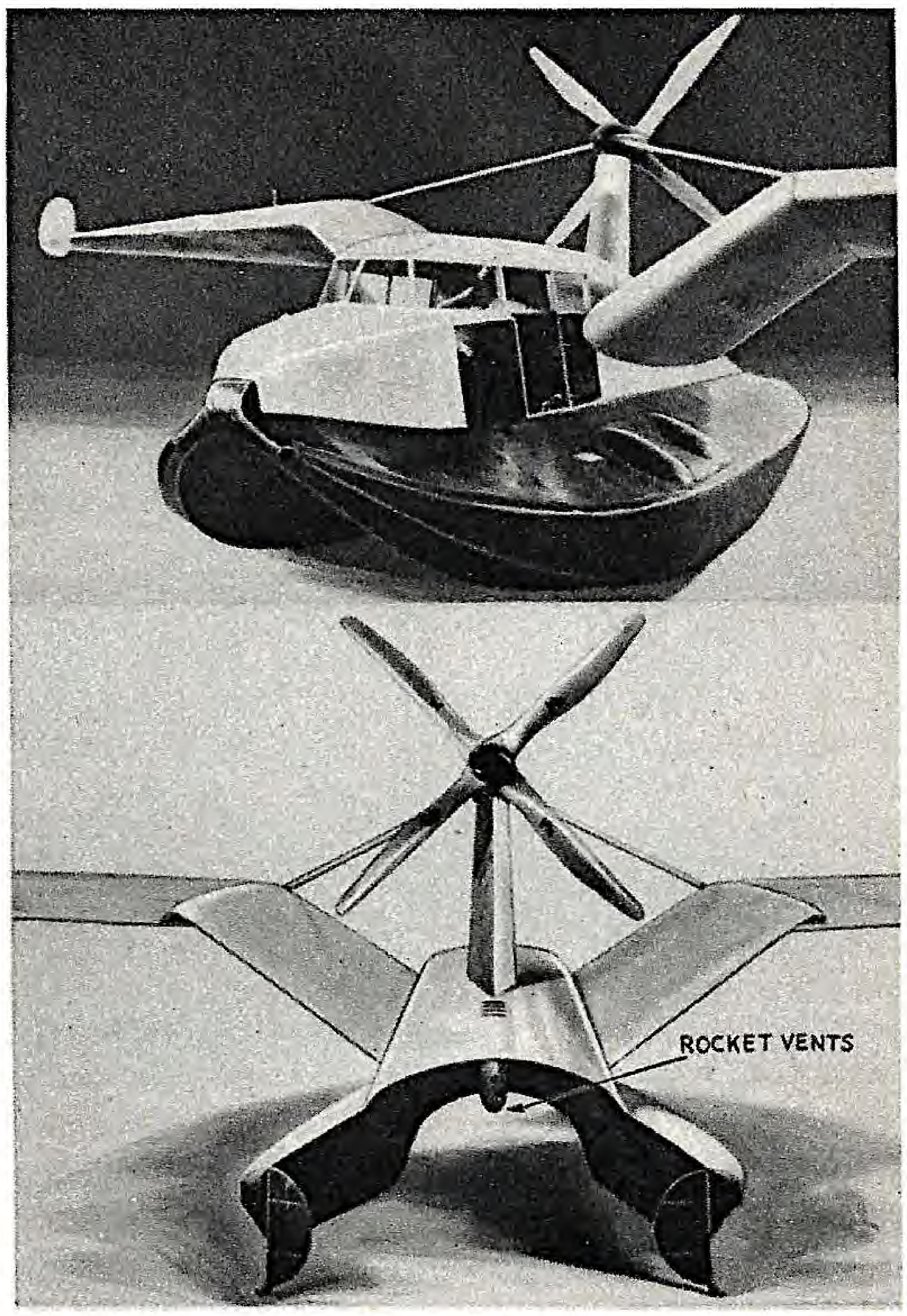


Surgical science (above) is fast becoming a democracy, and superstition is retreating as the searchlights of science bore deeper into the fog that shrouds human ailments. Our great grandchildren will probably drink heavy water for a future Fountain of Youth. For heavy water (see illustration at the right) is said to be paving the way to longevity. Turtle hearts require 48 seconds for their 10-beat cycle. But in heavy water they beat 10 times in 61 seconds.

New-Type Amphibian Uses Liquid Rockets for Take-off

A NEW type of amphibian plane combines unusual structural lines with a revolutionary use of twin Diesel engines. The engines drive a single four-blade propeller mounted on a high driveshaft located midway between the wings.

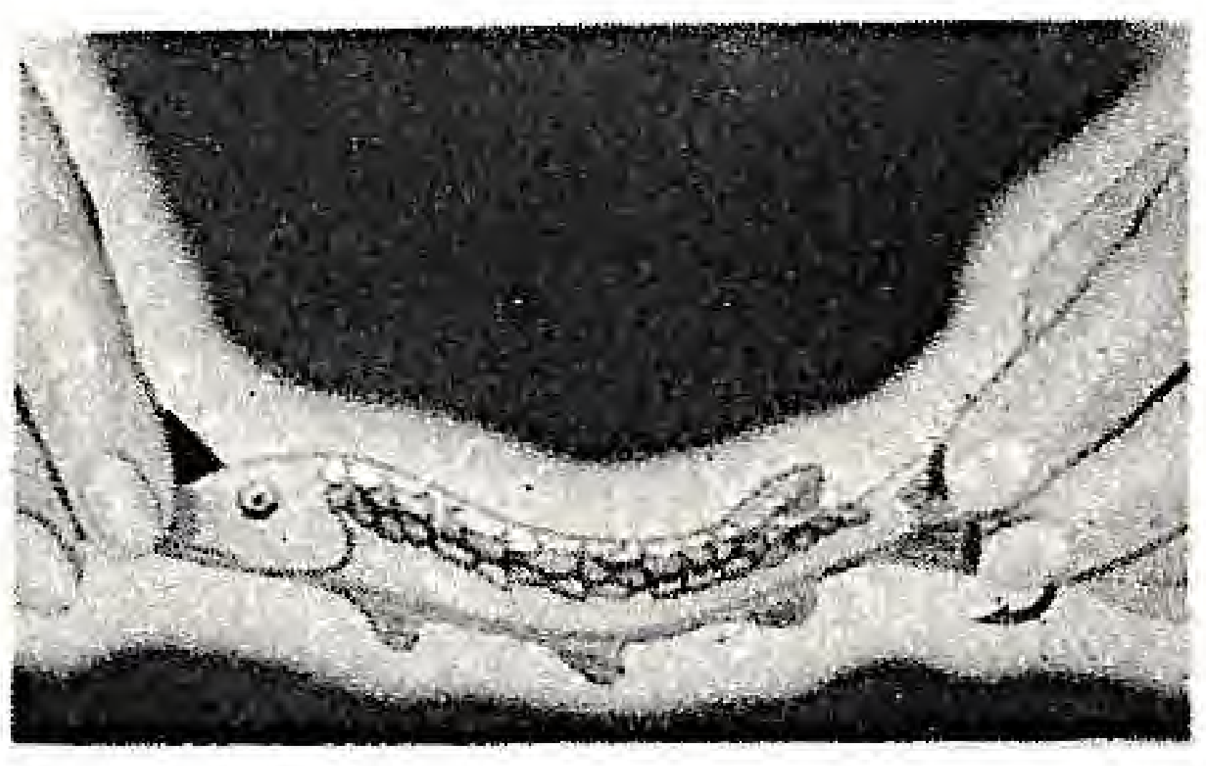
Another radical departure appears as a liquid rocket apparatus built into the stern. The rockets are intended to facilitate rapid take-offs. A wide cabin accommodates a pilot and two passengers. The wheels of the sea-gull project below the pontoons for a *terra firma* landing, but are retracted into the pontoons for a landing on water. Equipped with two stabilizers, one in each wing tip, the plane requires no tail. The plane's wheels are shod with a tractor tread.



This sea-gull amphibian mounts the propeller on a high driveshaft located midway between wings. Liquid rockets, intended to speed take-offs, are built into stern. The plane has no tail.

Artificial Bait Smells Like Fish

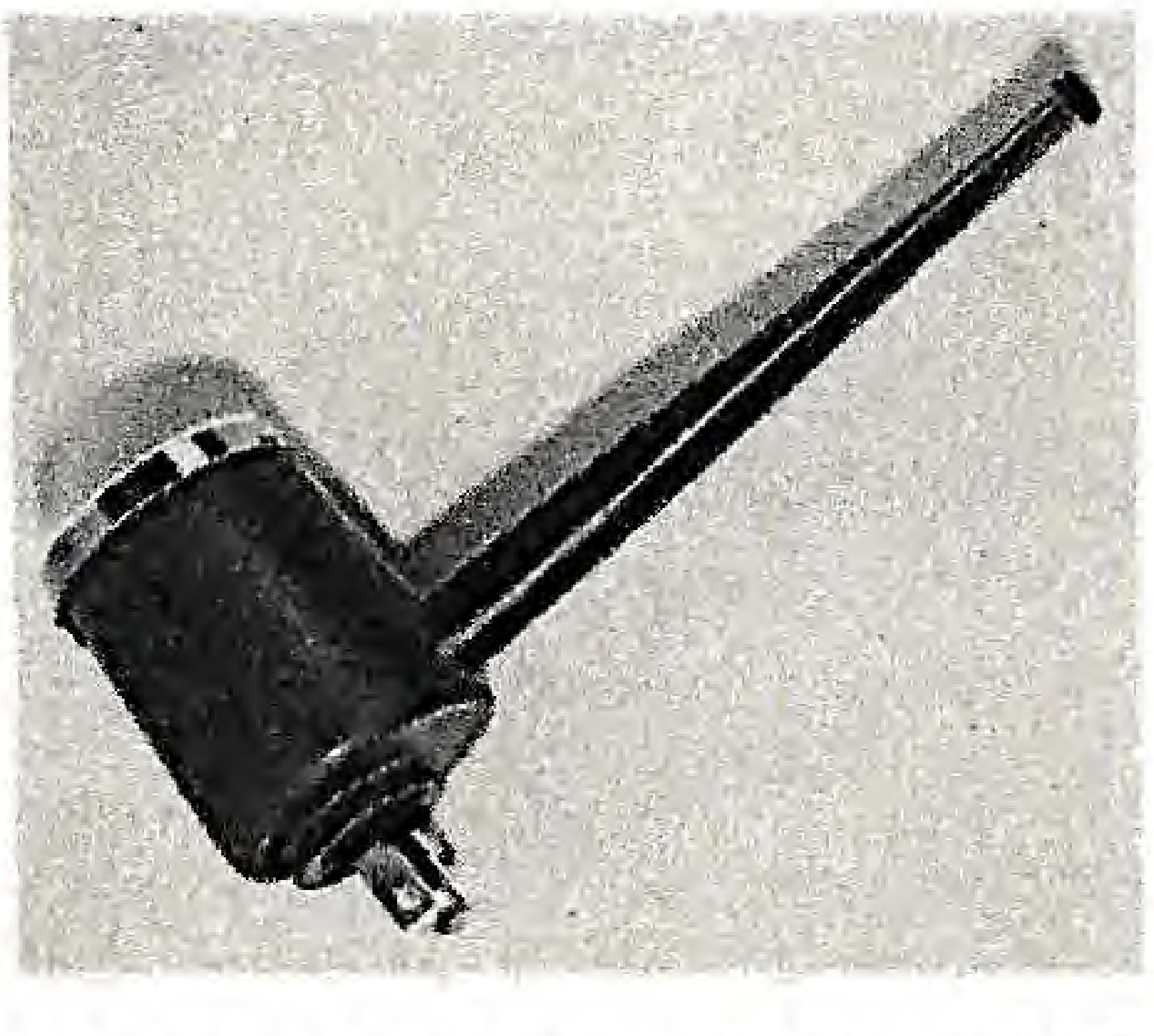
ANXIOUS anglers need no longer worry about effective bait. A new artificial bait has been developed which smells and acts like live minnows. Further, the bait can be so shaped that its action when drawn through the water duplicates that of an actual minnow.



This artificial bait smells and looks like live minnow. Suitable for game fishing, it can be molded by hand.

Electric Pipe Draws Off Nicotine

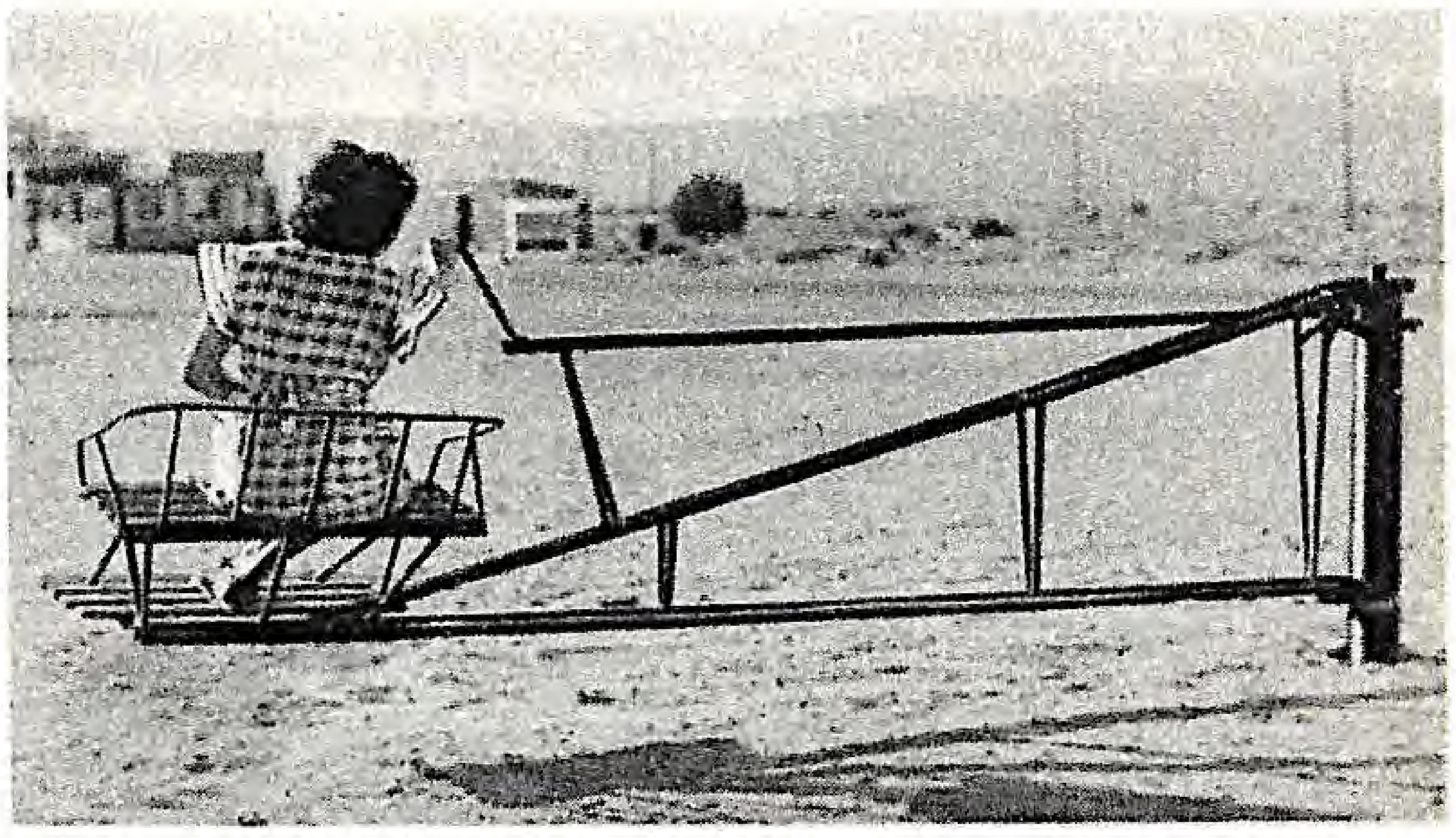
PLUGGED into an electric connection, an electric pipe, equipped with a thermostatic heating device built into the bowl, converts nicotine into smoke. The inventor noted that the nicotine and its aromatic products in tobacco are in the form of an oil which turns into smoke at a lower temperature than that of burning tobacco. He found that electric heaters will convert the nicotine and aromatics into smoke.



Here is an electric pipe in which tobacco smokes, but does not burn. Bowl has a thermostatic heater.

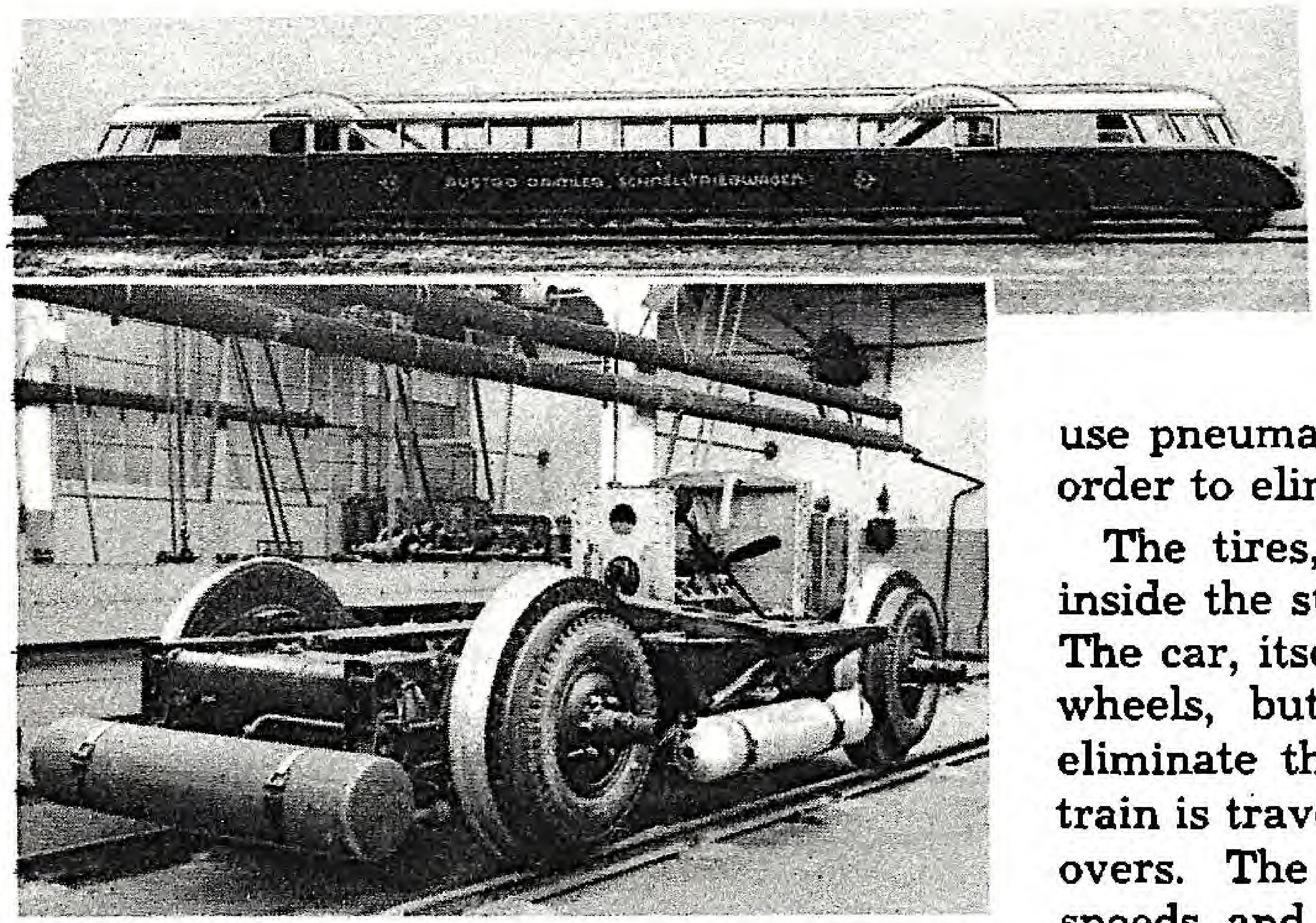
Rotating Swing Makes Dizzy Speed

A NOVEL swing built of tubular iron and propelled by a hand crank is making a bid for popularity. Using gears, the motion of the crank is utilized to propel the wing around a center post in a wide circle. "Racing" models can attain a speed of 45 miles an hour. The swing also boasts a ratchet attachment like a bicycle brake which permits coasting after the desired speed has been reached.



This swing can propel you 'round and 'round at a speed as high as 45 miles an hour. Motive power is obtained from gears and a crank. A brake permits free coasting.

Auto Tires Increase Riding Comfort of Austrian Trains



Pneumatic auto tires replace springs on this new Austrian built rail car. The tires at no time come in contact with the rails. The six cylinder engine, shown here, powers the train.

AUTOMOBILE tires are the latest contribution to the comfort of modern rail travel. Realizing that springs would never produce the smooth riding qualities found in modern automobiles Austrian railway engineers decided to use pneumatic tires on their fast rail cars in order to eliminate vibration.

The tires, which are of standard size, fit inside the steel car wheels, forming the hub. The car, itself, travels along the rail on steel wheels, but the centers, being of rubber, eliminate the jarring experienced when the train is traveling through switches and crossovers. The new rail cars are capable of high speeds and operate at a minimum expense through the use of specially designed engines.

Light Beams Operate New 'Phone

CARRYING on a telephone conversation over a distance of several hundred feet without any wire connections is possible with a recently invented photo electric device. The instrument consists of a microphone, battery and special beamed flashlight connected so as to cause the light beam to vary according to the words spoken. The receiving apparatus is another photo cell wired up to a regular telephone receiver. The effect of the light beam which is focused on this cell causes it to actuate the receiver so that the voice heard travels over a ray of light instead of wires as in the more familiar way. The phone is the work of Dr. J. B. Kramer, research engineer.

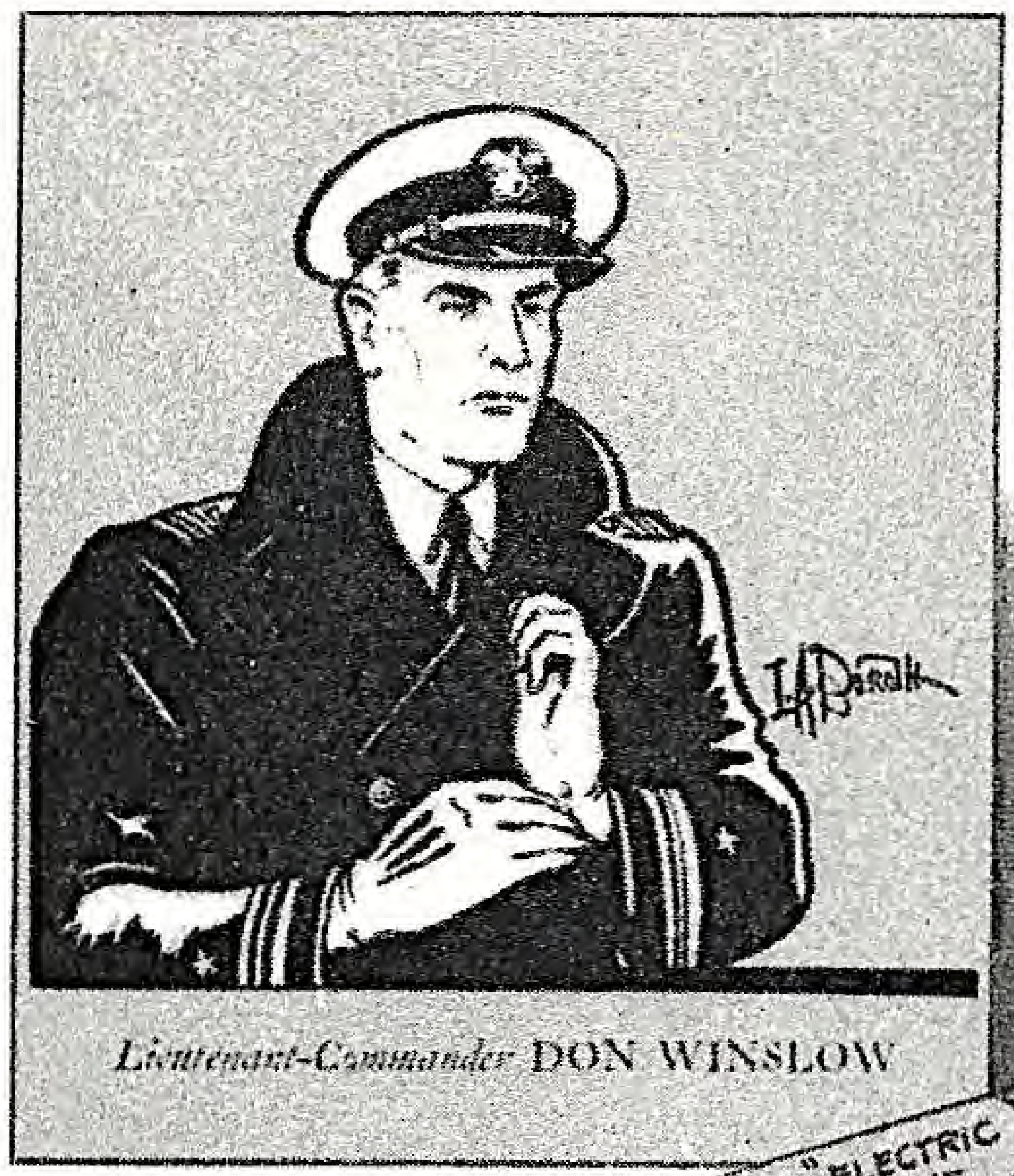
Equipped with one of these photo cell telephones you can talk to a neighbor without being connected by wires. The electric impulses travel over a light beam instead of telephone wires.

Ice Cream Dispensed In Paper Tube

All of the muss formerly experienced when eating ice cream from a cone is now eliminated with this new tubular container. Joan Blondell, of the movies, shows how it is done.

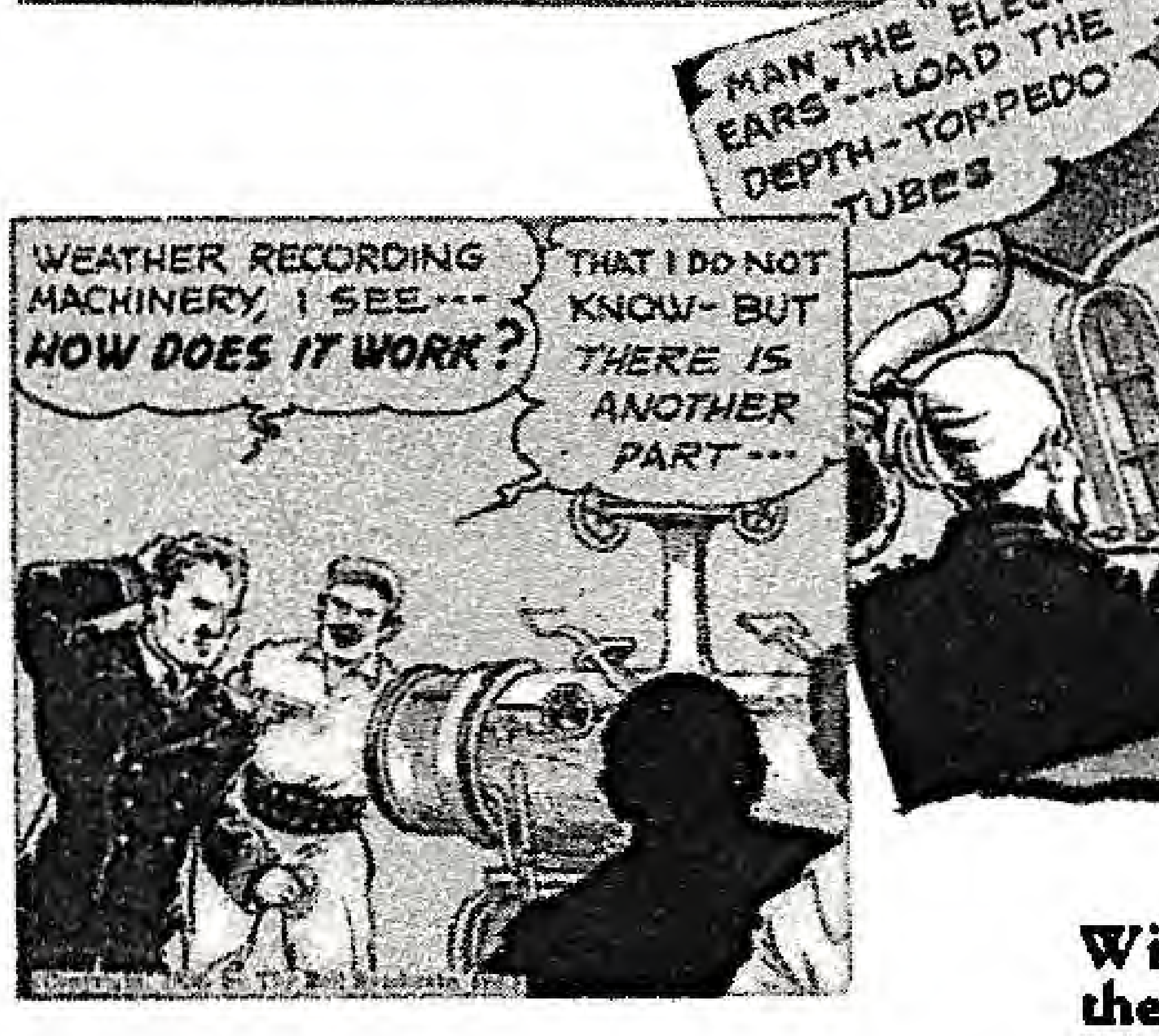
ICE cream becomes more tasty when eaten from one of the new spiral wrapped tubes recently introduced on the west coast. The tubes, which are filled at the factory, are provided with a tape permitting the tube to be torn as the ice cream is eaten. Inserted in a special waterproof compartment in bottom of tube is a small napkin permitting all traces of stickiness to be removed from the fingers.

Lieut-Com. Martinek--
The Jules Verne of The Comics


Lieutenant-Commander DON WINSLOW

Cartoons reproduced through courtesy of Bell Syndicate.

HOW IS IT, COMRADE, THAT THE SCORPION CAN – AS YOU SAY – OUTWIT HURRICANES, FROM HIS BASE HERE BELOW GROUND –
HE DOES IT BY MEANS OF THIS STRANGE MECHANISM –––
AYE, AYE, COMRADE
FROM THIS SCREEN I HAVE SEEN OUR CHIEF AGENT READ THE APPROACH OF HURRICANES!
IT'S A MASTER BAROMETER – WE'VE FOUND THE SECRET OF THE SCORPION'S SUCCESS!!


MAN THE "ELECTRIC EARS" – LOAD THE DEPTH-TORPEDO TUBES
WEATHER RECORDING MACHINERY, I SEE ––– HOW DOES IT WORK?
THAT I DO NOT KNOW – BUT THERE IS ANOTHER PART –––

To keep Winslow outwitting the Scorpion, Martinek must continually draw from his vast storehouse of imagination and Navy experience.

Winslow of the Navy and the Scorpion have flown their creator, Lieut. Commander, Frank V. Martinek, U. S. N. R. to the top flight of America's cartoonists.

THE government weather experts down at Washington would give a good deal to learn the secret of the Scorpion's master barometer—that marvelous instrument which photographs hurricanes like an infra-red camera and projects the storm center on a map like motion picture on a screen.

They'll never find out about it, though, without the consent of Lieut. Commander Frank V. Martinek, U. S. Naval Reserve. Nor about the man-carrying bat-wing gliders, or the Scorpion's marvelous submarine.

All of these, and a score of other extraordinary inventions, are the creations of that Jules Verne of cartoonists, Lieut. Martinek. They exist only in the popular newspaper cartoon strip, Winslow of the Navy. In a hundred newspapers throughout the country Lieut. Don Winslow wages continuous war against the Scorpion, a mechanical genius gone wrong, and a nest of international spies and secret agents who plot to destroy Uncle Sam's navy.

In an amazingly short time Winslow of the Navy has lifted Lieut. Martinek to front rank among the nation's cartoonists. He is one of the men who has made cartooning a big business, a profession which pays handsome dividends. He typifies the current trend of cartooning, which is away from "gag" and slapstick strips, and toward serial tales of adventure which are educational as well as entertaining.

Lieut. Martinek's working methods are interesting because they illustrate the rewards which the cartoon "industry" holds for the man with an idea. He himself does not draw the actual sketches—he has an artist who works up the drawings from his script. He also has one man who does nothing else but research work, checking technical points of naval practice which are presented in the strip. The production of a big-time cartoon strip thus involves several different departments, each in charge of specialists.

The income from a cartoon strip compares favorably with that of a bank president or a movie star. Syndication is the secret—each newspaper which publishes the cartoon pays a fee proportional to its circulation. This may not amount to more than $50 in the case of some papers; it may be a larger or smaller figure than that. But when multiplied by a hundred newspapers, the weekly income leaps up into four figures. A number of cartoonists have made themselves millionaires through their inkpots. The late Sidney Smith, creator of the Gumps, had a yearly contract calling for $100,000. In addition there are numerous other rights—book publication, movie shorts, dime store statuettes—which bring hundreds of dollars to the

[*Continued on page* 144]

Uncle Sam BATTLES

RADIO warnings, people evacuated to hills, city streets swirling torrents, houses tumbling down murky rivers, hunger, thirst, almost pestilence—that was the spring just past.

First flood, now dust—a billion tons of priceless top soil afloat over the ailing earth.

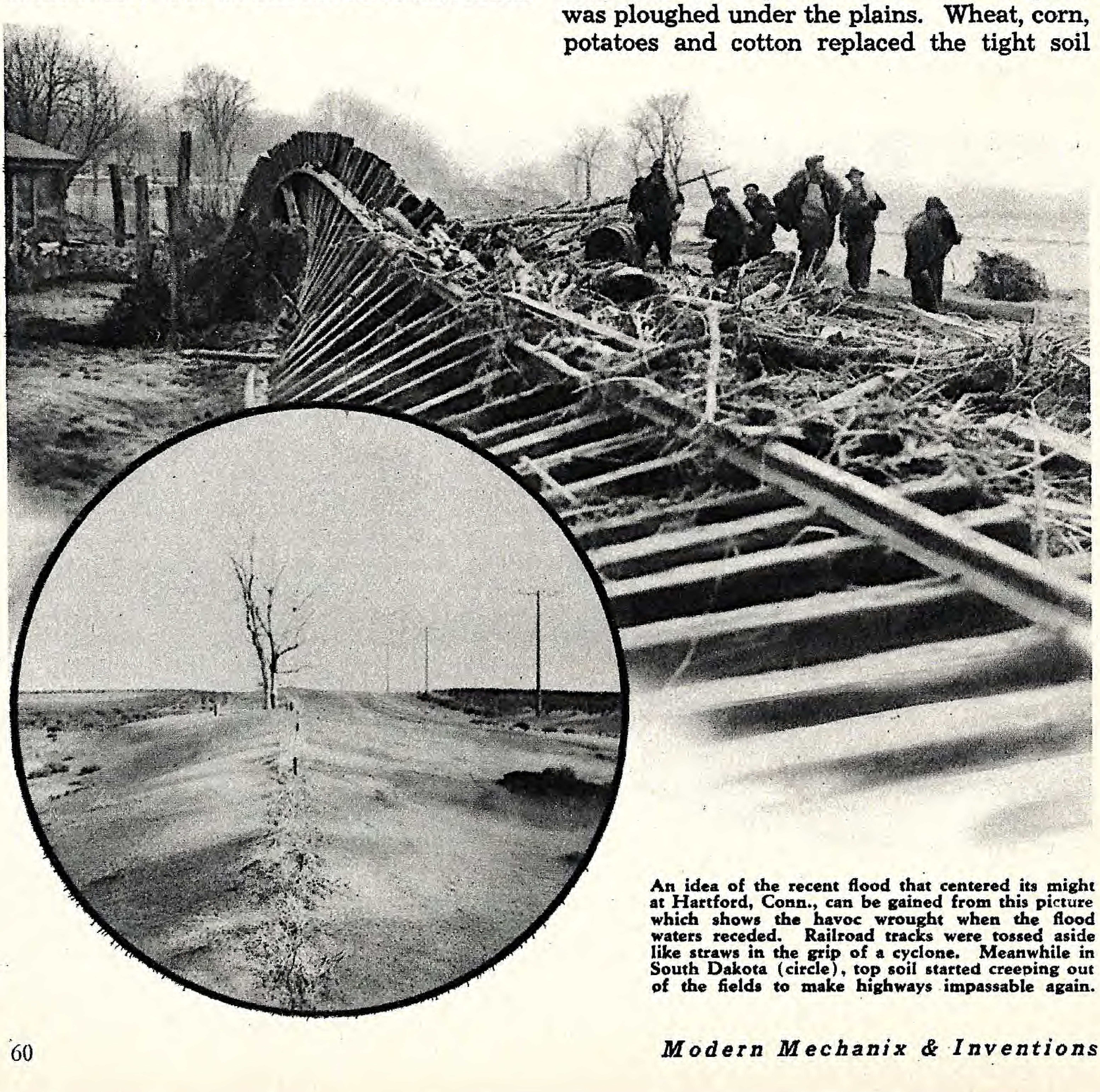
It is difficult to think of anything wetter than a flood, hard to imagine anything dryer than a dust storm, yet basically they are the same—Nature's way of venting her fury on man for upsetting her delicate balance.

Ol' Man River brings the flood down. We dam him, sand-bag him, stone his banks and bed, but always at the point of effect, seldom at the cause. But we can't even do that much when dust clouds storm the land. We can only choke, gasp for breath, and ponder the reason for it all.

The reason?

Nature gave a glorious land to the Indians, a land carpeted with vegetation, with undergrowth, the great trees of the forest, and the grassy plains for which these first Americans so vainly fought. The wind blew as hard then as now, and when rivers infrequently spread out of their courses, they did so slowly and with no violence.

Then came the white man—and civilization with covered wagons which rumbled further and further west. Forests were chopped from the hills to make homes for the descendants these pioneers left behind; grass was ploughed under the plains. Wheat, corn, potatoes and cotton replaced the tight soil



An idea of the recent flood that centered its might at Hartford, Conn., can be gained from this picture which shows the havoc wrought when the flood waters receded. Railroad tracks were tossed aside like straws in the grip of a cyclone. Meanwhile in South Dakota (circle), top soil started creeping out of the fields to make highways impassable again.

"DUSTERS" and FLOODS

by JAMES DYSON

and the matted grass binder. Nature was stripped bare.

Year after year Nature nursed her grief silently, striving with new undergrowth to repair the ravages man had wrought to her once proud beauty. Finally, when she couldn't stand the pain any longer, she went berserk—centering her wrath at Johnstown, Pennsylvania. Every year since she has somewhere wreaked her revenge on puny man with flood, drought and dust.

Chief H. H. Bennett, of the U. S. Soil Conservation Service, explains it this way:

Pour water on a slanting board. It dashes off immediately. Spread a rug or door-mat over the same inclined surface and most of the water is held back or absorbed. Some of it may run off, but it runs off in a trickle,

Dust, nothing but dust. An atmosphere filled with microscopic particles of drifting, sifting silt, covering everything and everybody. Dust, dust, dust.

Above—The birth of a flood. A striking and alarming picture of a cloudburst tearing across the land. When covering large areas, floods result. Note the menacing black rain clouds as contrasted with the yellow duster in Colorado as shown below. In this section people have died from dust pneumonia. One cannot tell night from day, so dense is the shrouding dust.

Work Rushed To Save U. S. From Desert

After the dusters tire themselves out, along come the tractor ploughs to push back the high tide of silt that the dry spell flooded over the stricken highways.

not in a flood. Apply the simile to millions of gallons of water rushing down denuded hillsides into streams that have limitations upon their capacity for carrying water, and the cause of floods is clear.

In the final analysis, there can be no permanent control of floods until we have control of erosion over entire watersheds, from the crest of ridges down across the slopes where floods originate and where soil is picked up to choke river channels.

There, too, lies the key to dust storm and wind erosion problems. The great "dusters" of the last two years, and those occurring now, are the result of a number of circumstances, topped by several years of intense drought. The overgrazing of cattle and sheep, along with the consequent destruction of nature's carpet, bared the soil on the high plains. The drought came along about this time, and with grain crops failing on successive years, no binder at all was left to hold the land together. The sun baked the soil oven dry and it crumbled to powder. The wind swept it up and buoyed it aloft to float for miles on end, billions of tons of it. And it took nature between 400 and 600 years to create just one inch of this priceless top soil. In the United States 75 per cent of all cultivated land slopes enough to be subject to water erosion. The steeper land should never be broken; it must be permitted to go back into trees and grass.

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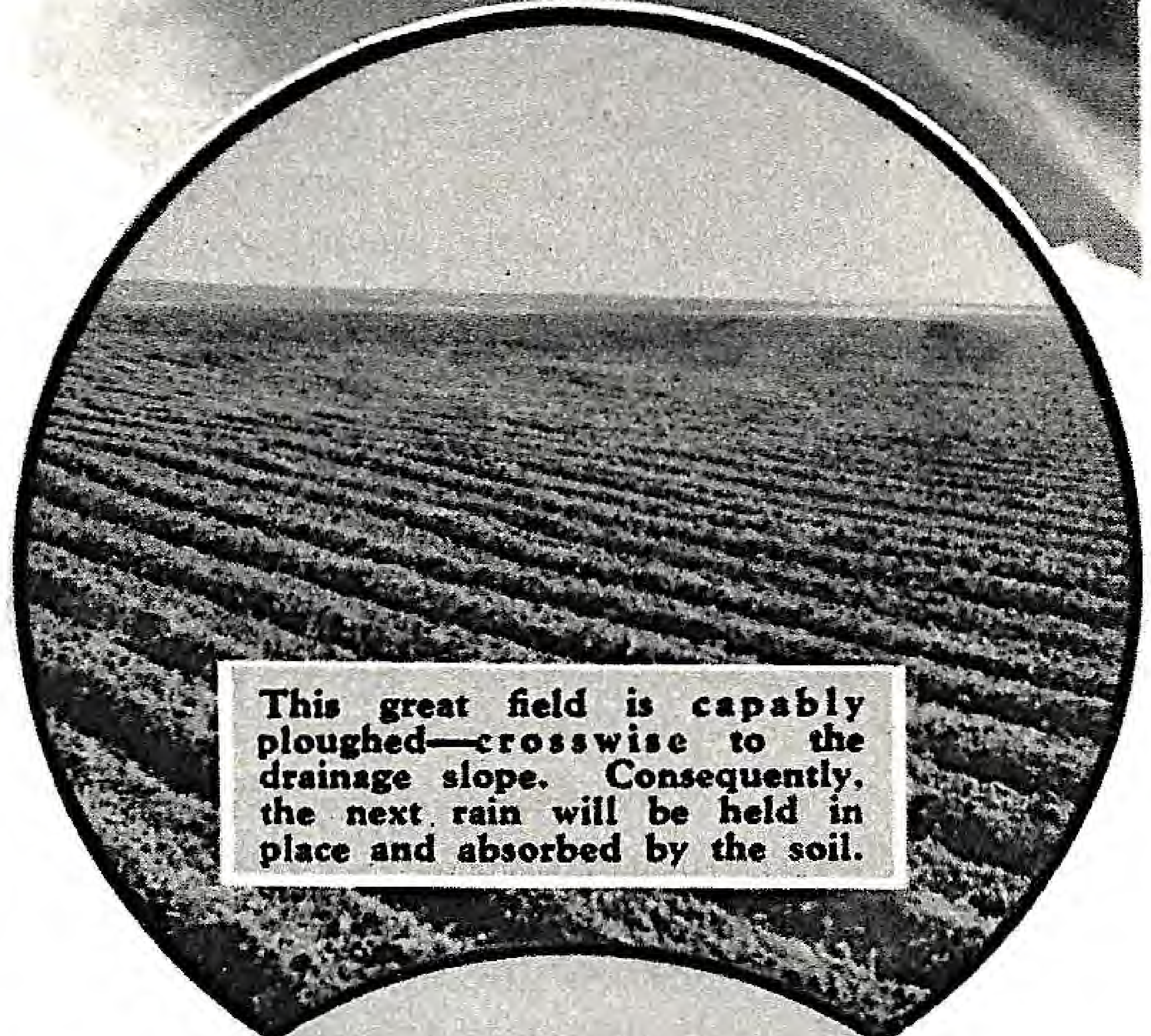
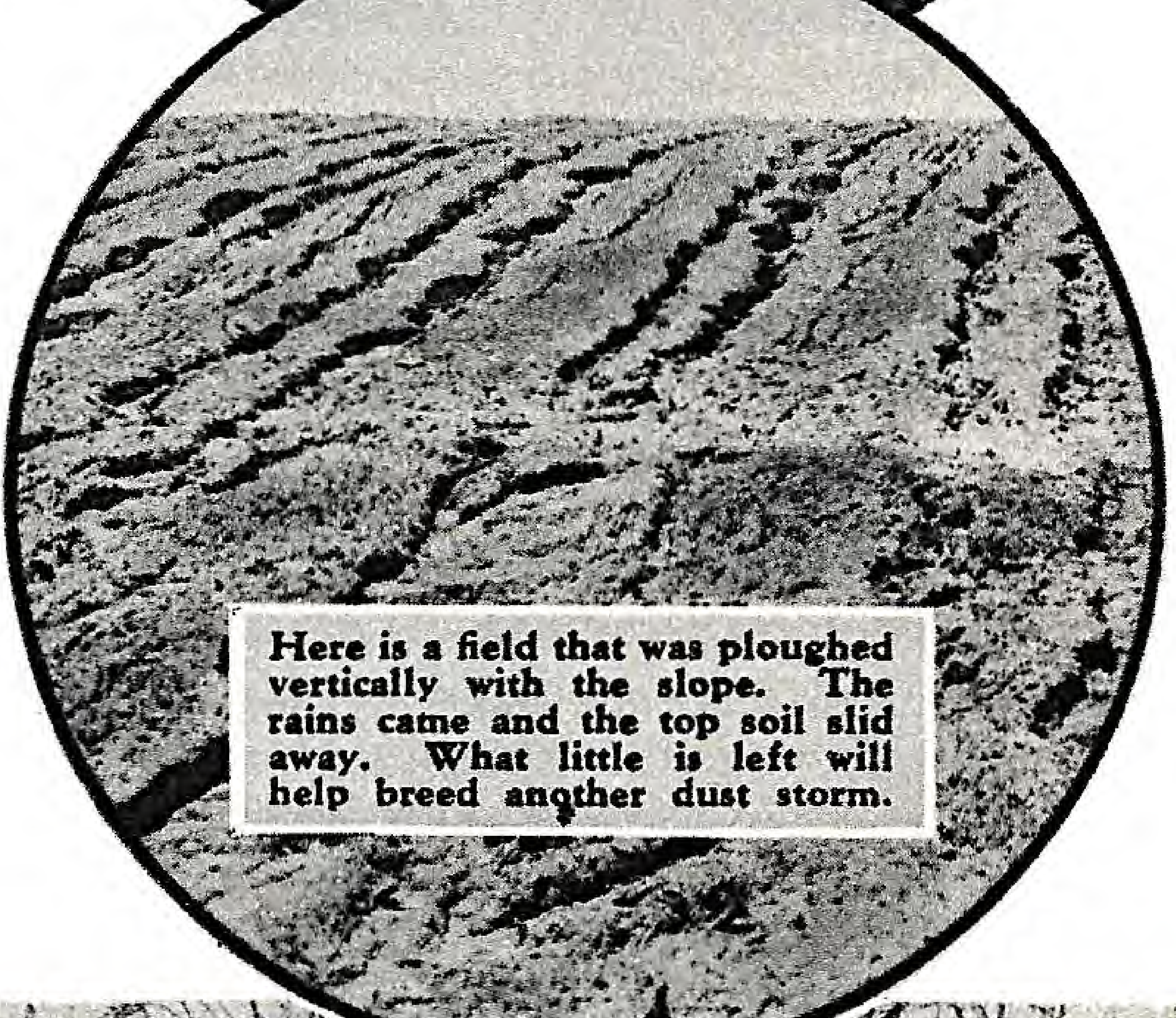
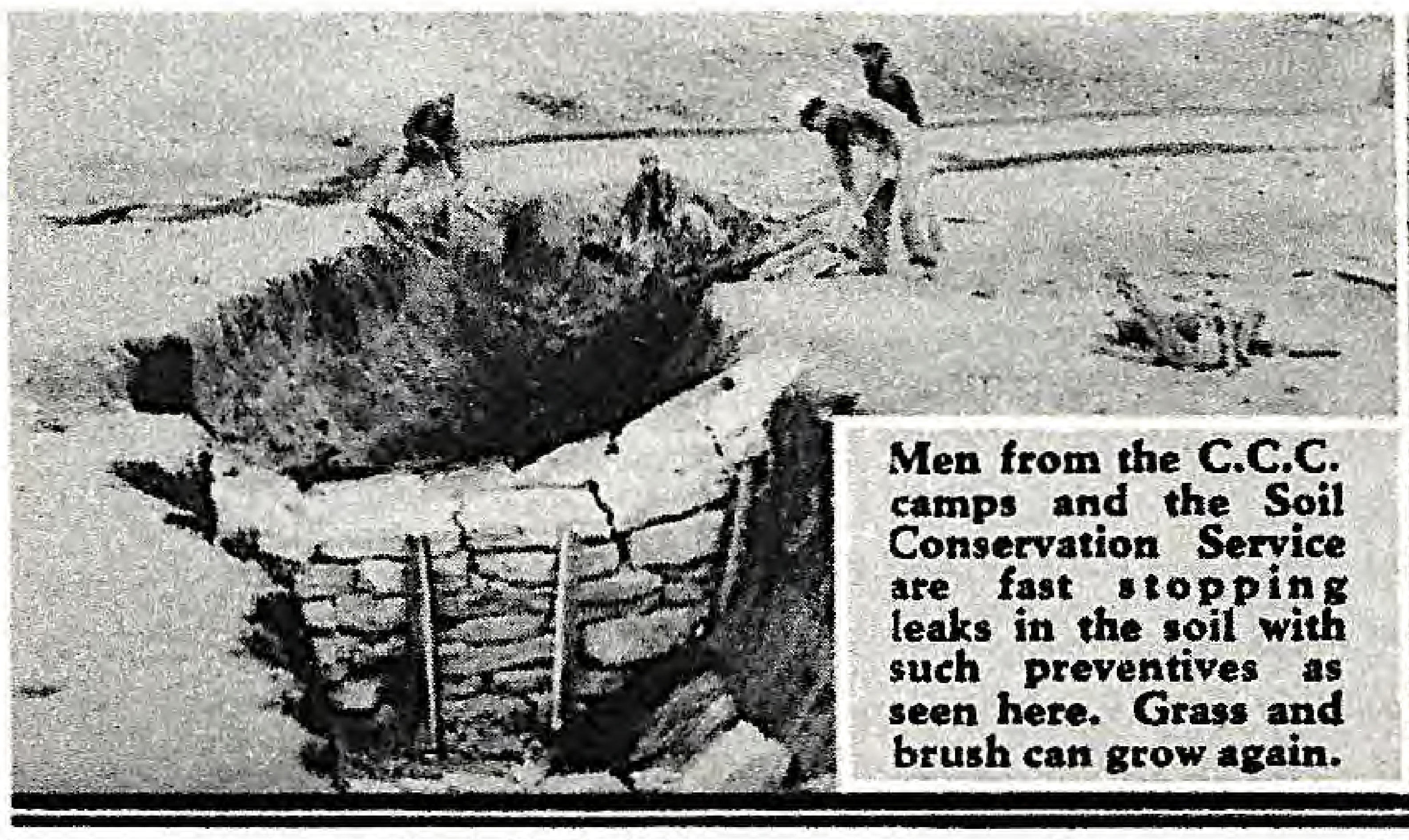


This great field is capably ploughed—crosswise to the drainage slope. Consequently, the next rain will be held in place and absorbed by the soil.

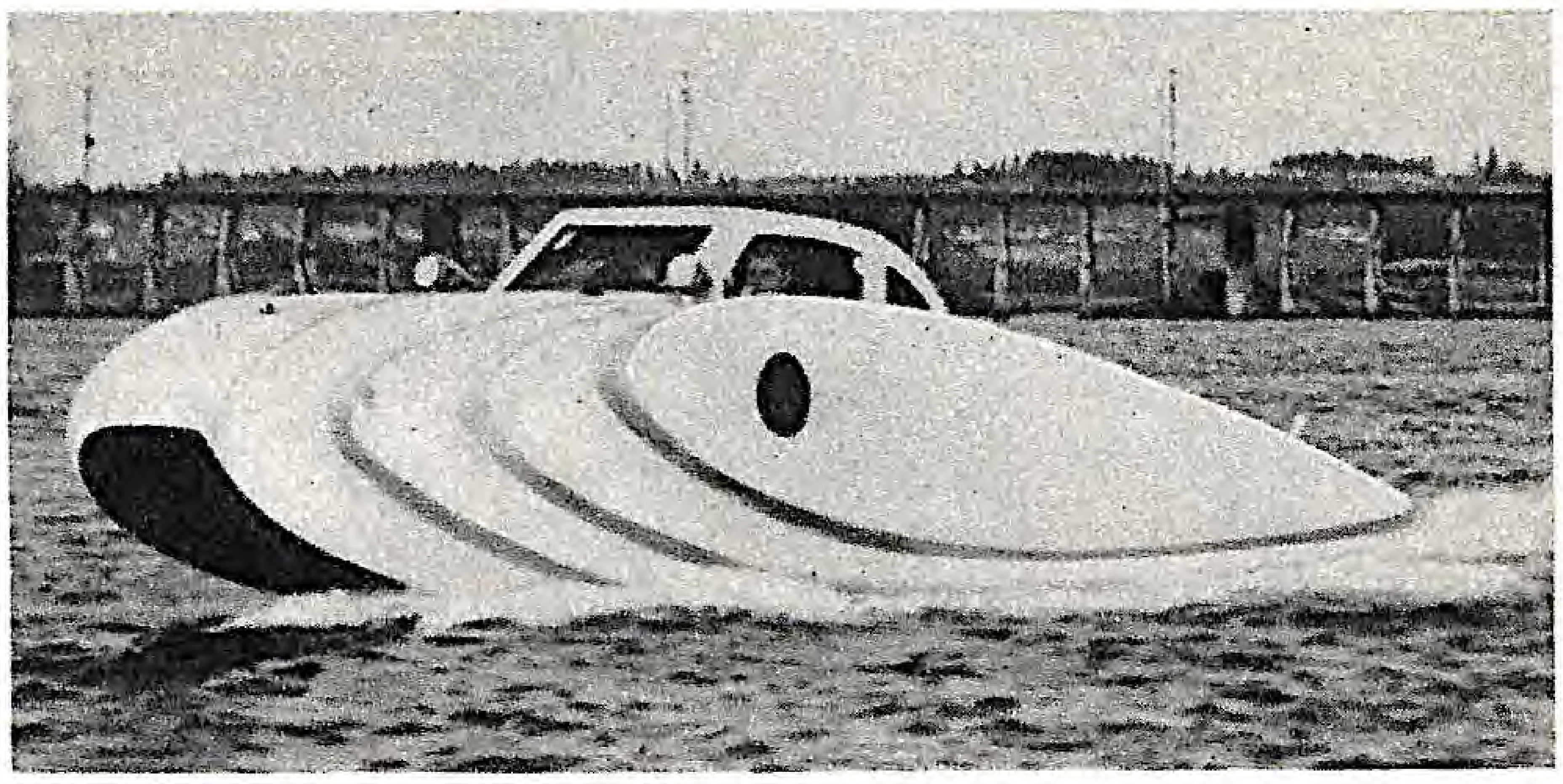


Here is a field that was ploughed vertically with the slope. The rains came and the top soil slid away. What little is left will help breed another dust storm.



Men from the C.C.C. camps and the Soil Conservation Service are fast stopping leaks in the soil with such preventives as seen here. Grass and brush can grow again.

Sea Rescues Aided By Streamlined Seagoing Ambulance



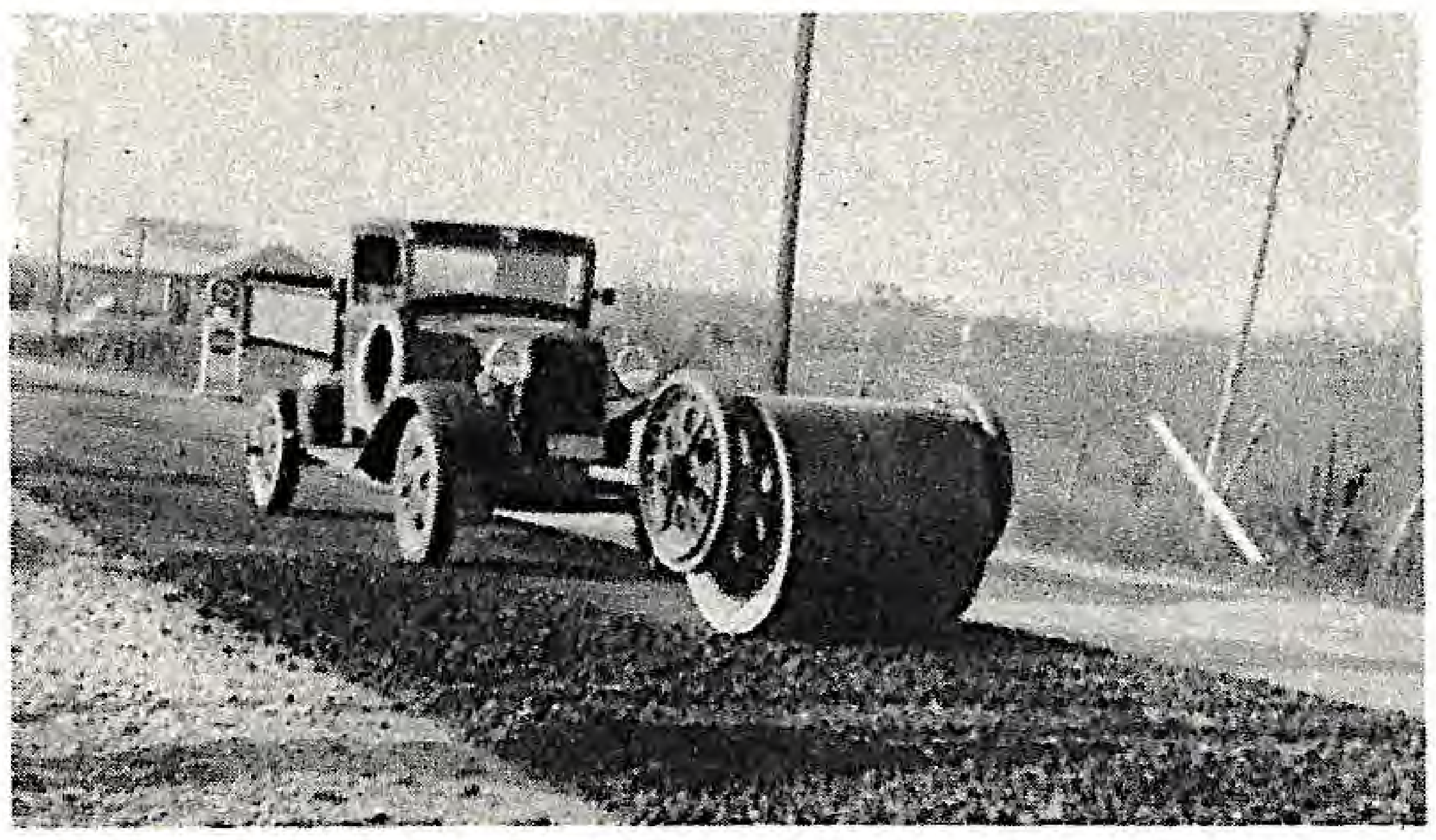
The Aerohydrocraft marine ambulance is shown, above, undergoing tests in waters near Portland, Oregon. The strange boat is unusually flexible and capable of speeds of 50 miles per hour. Aviation streamlining is evident.

DESIGNED for marine rescue work a water ambulance with a cruising speed of forty miles-per-hour was recently placed in service by the city of Portland, Oregon. The boat is the work of Victor W. Strode, pioneer inventor of streamlined hydroplanes, who startled maritime circles with his first high speed water plane, the Aerohydrocraft.

High safety factors and a cruising speed equal to that of an automobile demanded that the ambulance possess unusual flexibility and stability so that it could be properly handled under all circumstances. The new craft is completely revolutionary over others and employs to the utmost, principles of streamlining and aerodynamic lift.

A series of air foil sections, similar to the stub ends of aircraft wings, are so constructed in sets of declining size that at high speeds they produce a maximum amount of lift.

Truck Operates Highway Roller



Provided with pneumatic tires mounted on an eccentric axle this portable road roller can be brought into action simply by reversing the tongue. A truck supplies the motive power.

INTENDED for use where a regular road roller would prove too costly a new device recently invented attaches to any truck and does work equal to that done by regular rollers. Provided with rubber tired wheels the machine may be towed to the scene of construction with the same ease as any trailer. One of its advantages being that it does not tie up highway traffic when moved from one location to another. The roller at the same time saves money since it can be on the job much sooner than can the slow-moving steam operated type. An eccentric axle lowers or raises the roller.

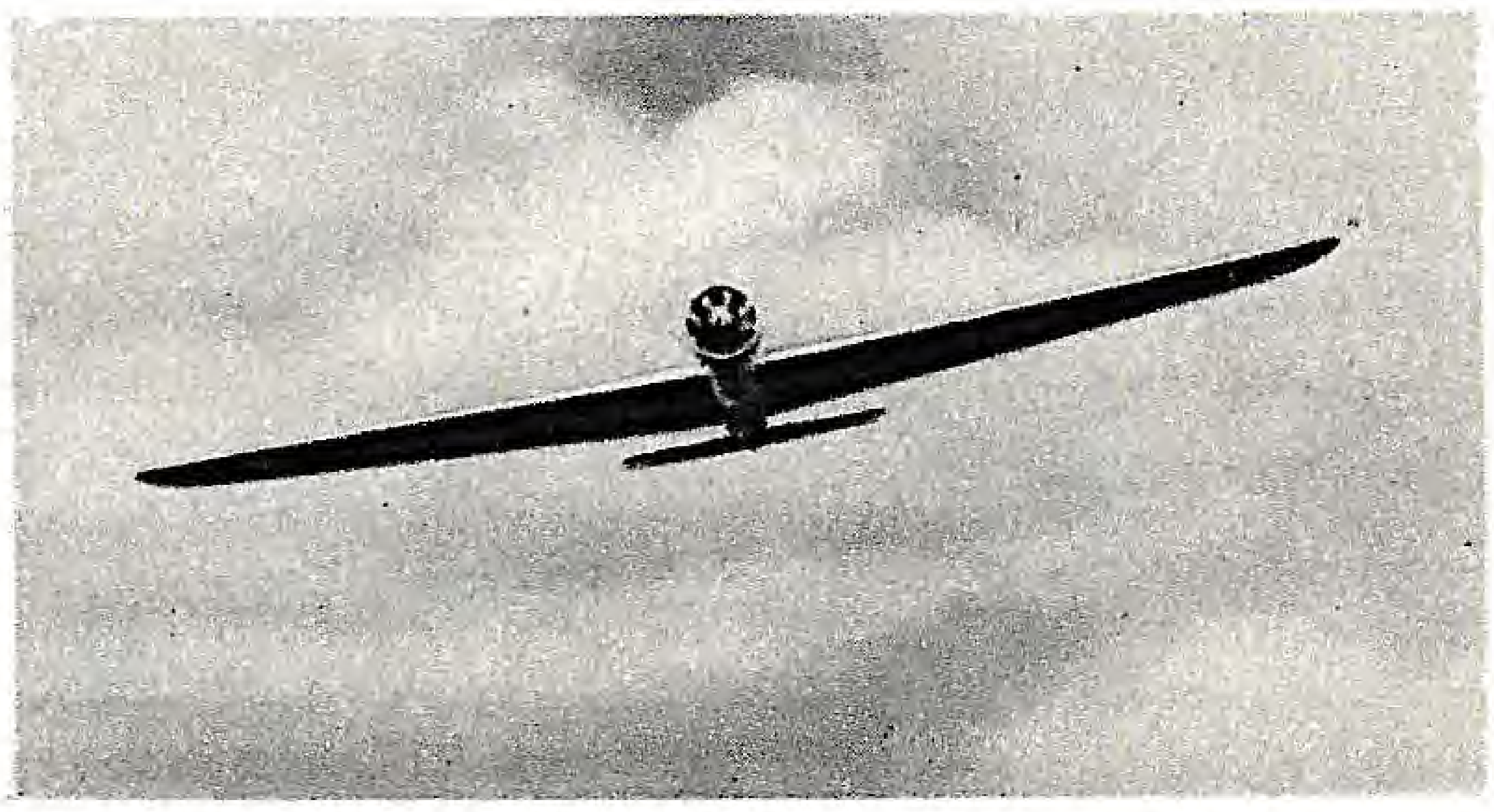
Planes Feature Novel Wing Design

WITH all of Europe tense over the present possibilities of war among certain powers the government of Great Britain is taking steps to guard her interests, should such an emergency arise, through the use of a new war plane.

Designed by Vickers, one of the leading manufacturers of airplanes in England, the British Air Ministry is reported to have completed secret negotiations with them for delivery of a fleet of the new crafts.

The planes are said to embody a revolutionary type of construction. The wing spars are of the new Wallis Geodetic design permitting the wing, itself, to be very thin and in this way reduce wind resistance so that the speed is increased.

An unusual feature of the Vickers aircraft is the tubular material employed in building the framework. Instead of the usual solid material metal tubes were substituted in order to reduce the weight as much as possible. Although lighter than other war planes they are just as air worthy.



Here is seen one of the new British Air Ministry planes roaring through the skies near London. The new war craft features a tubular framework construction and a special type of wing.

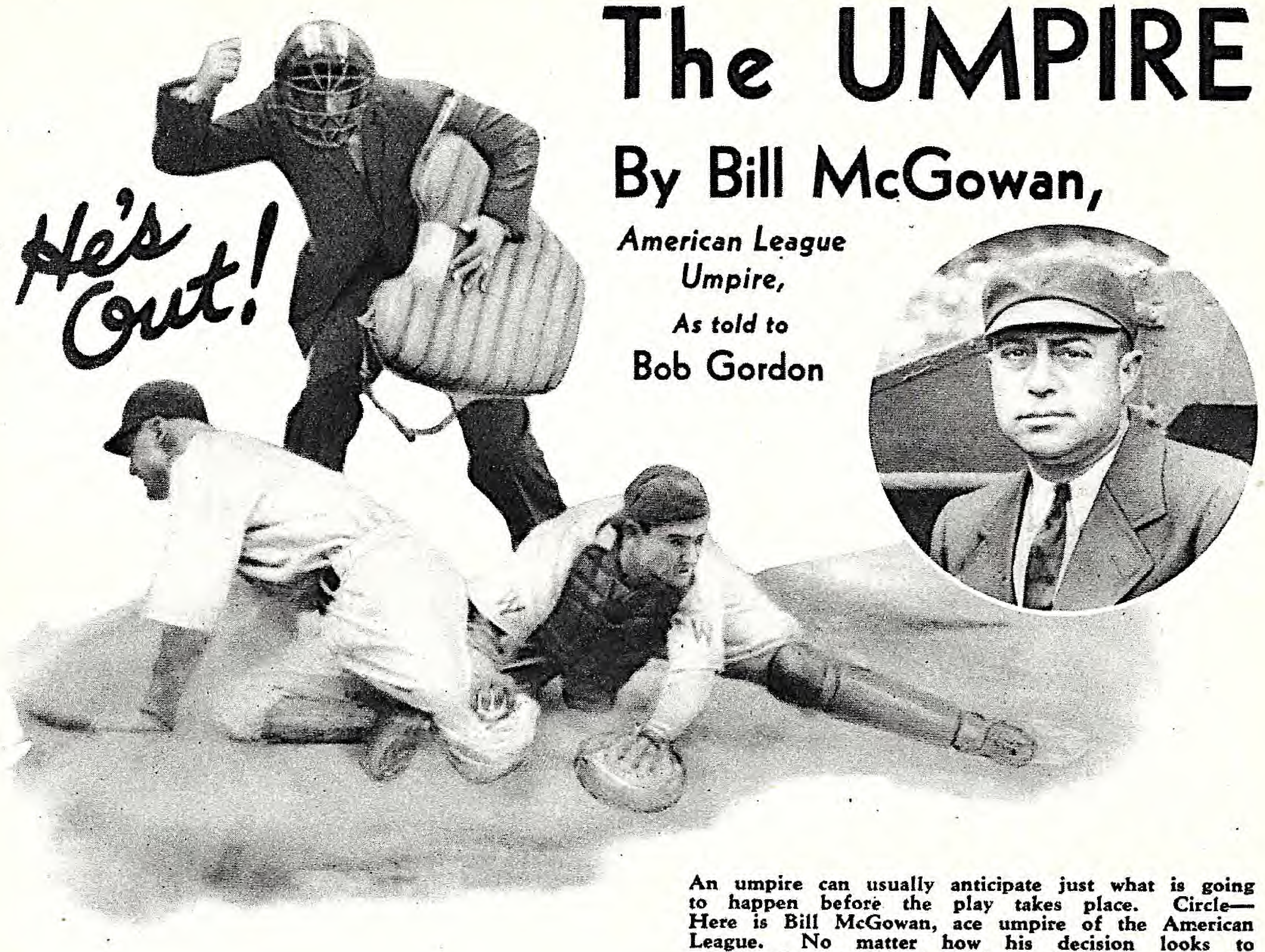
The UMPIRE

By Bill McGowan,

American League Umpire,

As told to

Bob Gordon



An umpire can usually anticipate just what is going to happen before the play takes place. Circle—Here is Bill McGowan, ace umpire of the American League. No matter how his decision looks to you in the stands, he is ninety-nine per cent right.

"TO TELL you the truth, I never even see the plate. No umpire does."

That admission was dragged out of Bill McGowan, and Bill is a good umpire. He was voted the best umpire of 1935, so he must be good.

I was out to discover the difference between the big league umpire and the sand lot baseball judge, and Bill was just the man to tell me.

"First," began McGowan, "your eyes must be good. And any doctor will tell you that your stomach must function properly or your eyesight suffers. To keep your stomach fit, you must be physically right all over. That is the reason the American League sends its umpires south with the players at the beginning of the season. They must be in perfect shape when the season starts.

When McGowan got around to the mechanics of his job, I thought for a moment that I was taking lessons from a golf pro, for he started talking about stance. Stance seems to be the first fundamental that an expert stresses in practically every physical sport. And as with experts in other sports, the umpires don't agree on details of the stance, but they do insist on balance and a comfortable position. Looking over from 300 to 1,000 pitches in an afternoon is a strain at best.

When the batter steps to the plate the umpire looks him over carefully, noting exactly the height of his shoulder and knee. The shoulder as the player stands erect has no bearing on umpiring at all. It is where the shoulder is while the batter is taking his natural swing that determines whether a pitch is too high to be called a strike.

Frankie Zoeller, who used to lead off for the Atlanta Crackers when McGowan umpired in the Southern League, presented perhaps the smallest target for a pitcher in professional baseball. A midget to start with, he had such an extreme crouch when he swung that the pitcher had very little room in which to get over a strike. Zoeller consequently drew more than his share of free trips to first.

Having sized up the batter, the plate umpire keeps his eye on the pitcher. If there are men on base he must watch for a balk. After stepping onto the rubber and taking his preliminary stretch, when men are on base, the pitcher must hold the ball chest high and do one of three things next—either step toward

NEVER SEES the PLATE

"He's Out!" yells the umpire, and you're out, too—out to "Kill That Umpire!" But get behind the plate with Bill McGowan and see what it takes to call the close ones.

Another example of the umpire's exact timing. (Above) Note his arrival at best spot to check on both runner and baseman in a close play. To him this isn't a close decision, but an easy one.

Those were the happy days, when grand old "Babe" swung on the last strike—and missed. For the runners always took to stealing bases, thus giving the worried catcher something else to worry about.

the plate and deliver the ball to the batter, step toward the occupied base to which he wishes to throw, or step backward out of the box. To do anything else—even to scratch his nose—constitutes a balk and entitles the runners to advance unmolested.

Once the pitch has started toward the plate, the umpire follows it with his eyes until it plunks into the catcher's mitt. Sometimes the catcher will attempt to "help" his battery mate by quickly pulling in a wide one, then holding his glove so the umpire can see how good the pitch was. The funny part of it is that the catcher usually protests when the umpire calls it a ball.

"That never fools a good umpire," McGowan said. "When a catcher pulls one on me I always call it a ball, because why should he pull a strike? Does he hope to get two strikes on the same pitch?"

"How," I demanded, "do you manage to focus on both the fast-moving ball and the stationary plate?"

He threw up his hands in defeat. "Man," he said, "I never see the plate. I know exactly where it is, but I never see it."

So fans, when the umpire takes out his little broom and dusts off the platter, remember it's so the pitcher can see it, the batter can see it, so you can see it, or perhaps it's only a sanitary gesture.

And that brought up another question. "The rules state," I said, "that if the batter swings his stick across the plate it's a strike whether the ball is across or not. How can you tell if the batter stops his swing in time?"

"Often we can't," McGowan replied. "Gehrig and Lazzeri can start a full swing and stop it by pulling the bat up while it still has full momentum. With my eye on the ball, I often don't know whether or not the bat crossed the plate."

"So what?"

"So I call for help. I shoot a quick glance at the base umpire, and he flashes me the signal. So good is our team work that the fans and players seldom see such signals, which are always perfectly natural movements. I can get the sign on a doubtful half swing and call it without any delay being noticed.

"And that isn't the only signal we have," McGowan continued. "Things sometimes happen so fast on the diamond that an umpire in position for one play is blocked out from

[*Continued on page* 130]

PARAGRAPH ODDITIES
OF SCIENCE

MOSQUITOES in the Chicago area will be dyed green, red, yellow, brown and blue so that their victims will know just where they come from and can report to the local entomologists. Corey Smith, Erie, Pa.

Corn, beans, and sawdust were used to stop a mine flood. When the materials got wet they swelled, sealing the tunnel.—Thomas Henshaw, New York, N. Y.

A system of permanent highway markers was in use in Persia as long ago as 550 B. C. —John Dopak, Jr., Chicago, Ill.

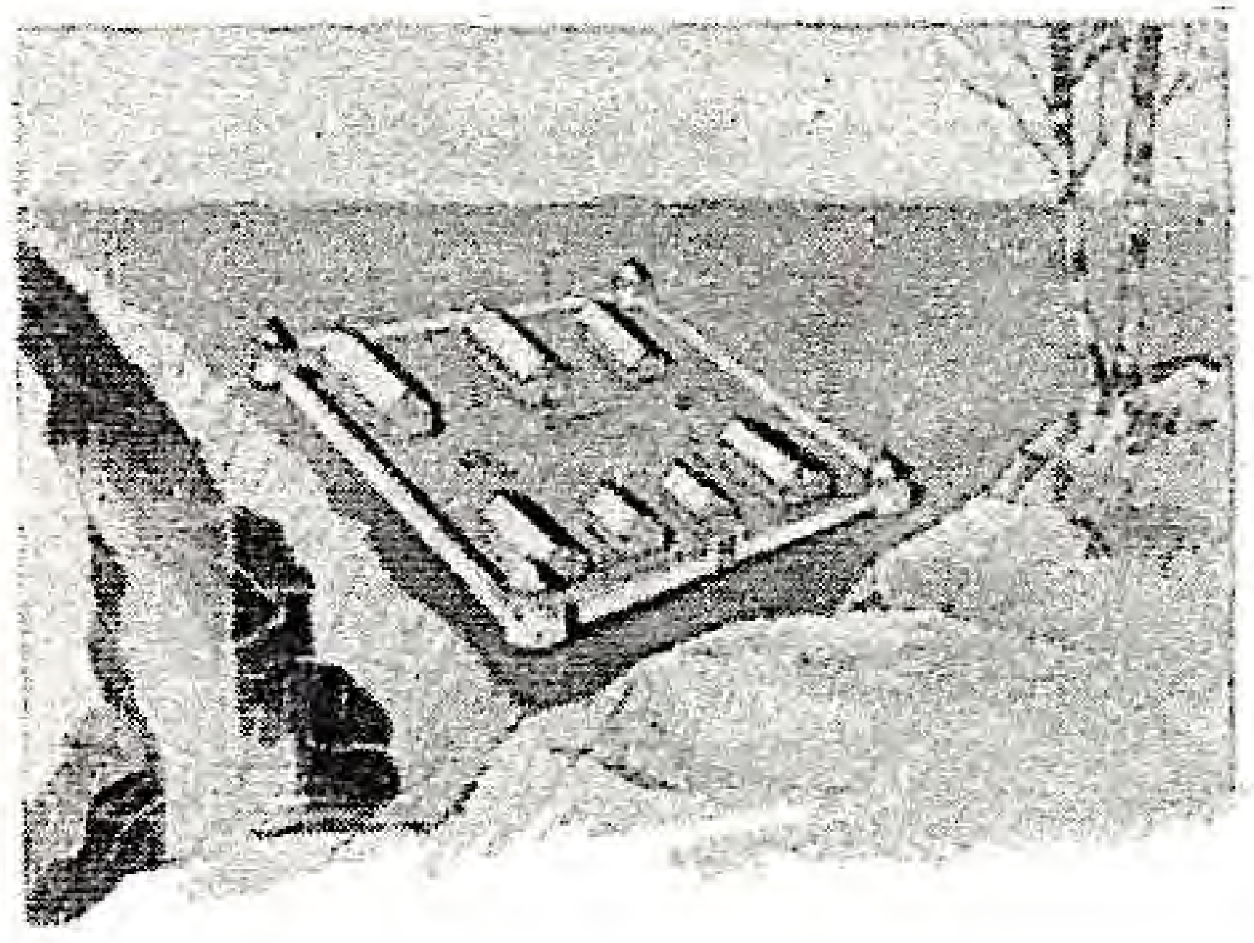
Nearly half of the United States tidal coast line is in Maine. Because of its numerous coves and bays, Maine has 2,486 miles of coastline.—Marvin Carlson, Hector, Minn.

Hedgehogs were once kept in London kitchens to destroy insects. They slept in the cupboards by day, coming out to feast on insects at night.—G. V. Silver, Los Angeles, Cal.

In Japan each new year will be ushered in with a new stamp issue.—Montgomery Mulford, Buffalo, N. Y.

The Blue Nile of Egypt has a drop of but six inches in 1,000 miles.—F. E. M. Gomez, Sancti-Spiritus, Cuba.

Old Fort Henry, on the Canadian side of the St. Lawrence river near Kingston, was built backwards. The fort, while impregnable from the river, lay below a steep bluff, and the whole interior was exposed to gunfire from the hill. — Sterling Begg, Kingston, Ontario.



In 1879 a Berlin, Germany, cat-post had 30 tomcats in service carrying mail. The cats worked like carrier pigeons, always returning to the post office.—James Laurence, Vancouver, B. C.

A tree in Zion, Ill., looks like a pear tree, bears fruit shaped like apples, in clusters like grapes, but the fruit tastes like half ripened peaches.—Lawrence Shumaker, Zion, Ill.

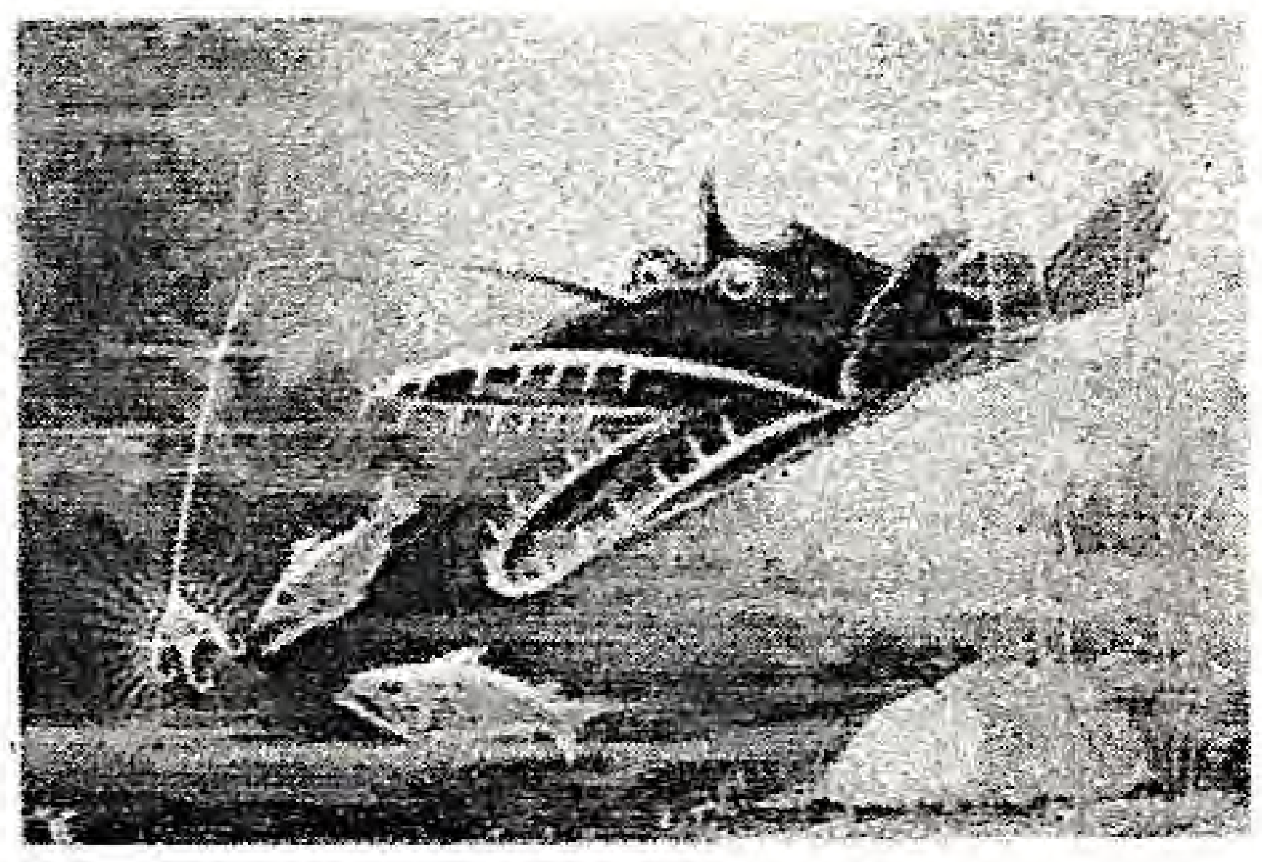
If water, like other liquids, contracted upon freezing, the world would soon be covered with ice. Its peculiar properties of expansion keep ice on the surface where it melts readily. —J. E. Winterton, San Pedro, Cal.

Canadian railroads are more than 600 miles longer in summer than in winter, due to the expansion of the rails.—Herbert Evers, Sarnia, Ont.

Water started a fire that water couldn't put out in Brewton, Ala. Flood waters invaded a warehouse filled with lime and the chemical reaction started the fire.—Jerry Tippin, Brewton, Ala.

In the year 130 B. C., Hero of Alexandria invented a steam engine, and it was not until 16 centuries later that Giovanni Branca invented a better one.—M. Perkins, Rutland, Vt.

The *lasiognathus,* a small, deep-sea fish, has an angling outfit protruding from its head.—Kevin MaGee, Yonkers, New York.



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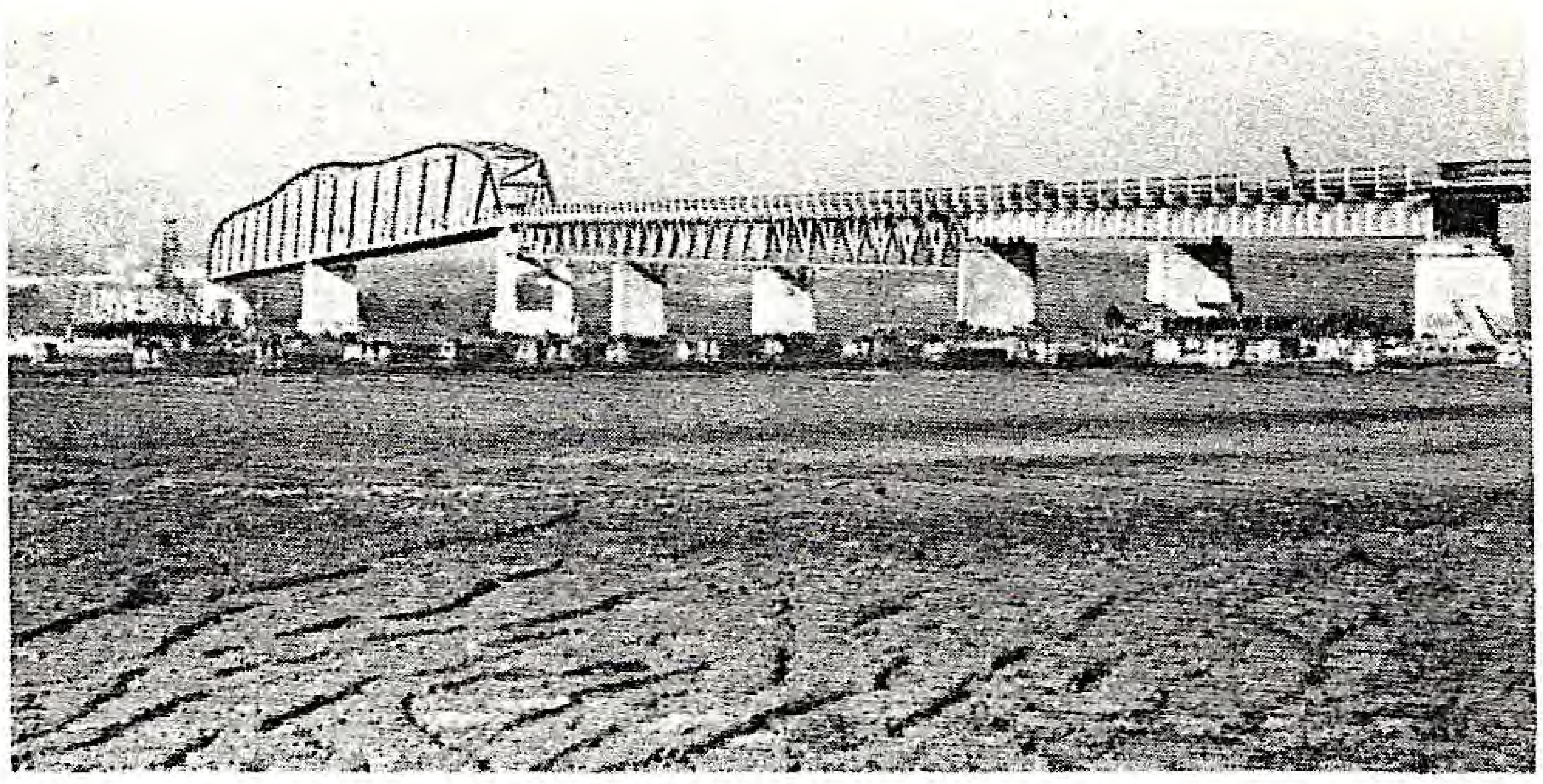
Missouri River Ousted from Bed; Bridge Built On Dry Land

DIKES and retards used to switch the Missouri River from one side of its banks to the other, played a prominent part in the construction of the new $1,650,000 bridge at South Omaha, Nebraska.



The soil shown in this picture was once the bed of the Missouri river at Omaha, Neb., but engineers wanted to build their bridge on dry land. They crowded the river into a narrow channel on one side, built half the bridge, and then pushed the river back to build the other half.

Engineers, confronted with the problem of sinking piers into a mud bottom covered with a few feet of water, decided that the easiest method would be to force the river through a narrow channel near one bank, leaving the opposite high and dry.

Dikes and retards were constructed accordingly, forcing the Missouri into a new bed. When the piers for one side of the bridge were completed, the river was switched to the opposite bank.

Table-Top Foundry Does Real Work

This complete foundry shop for the home workshop will make castings and art objects from practically any metal having a melting point of less than 2,400 degrees F. It uses gas.

A COMPLETE foundry set which will make castings or art objects from practically any metal or alloy having a melting point of 2,400 degrees F. or less, is now available for the home workshop.

The miniature foundry consists of a gas furnace with motor blower, fire clay crucibles, moulding sand, and all the other accessories for any type of work.

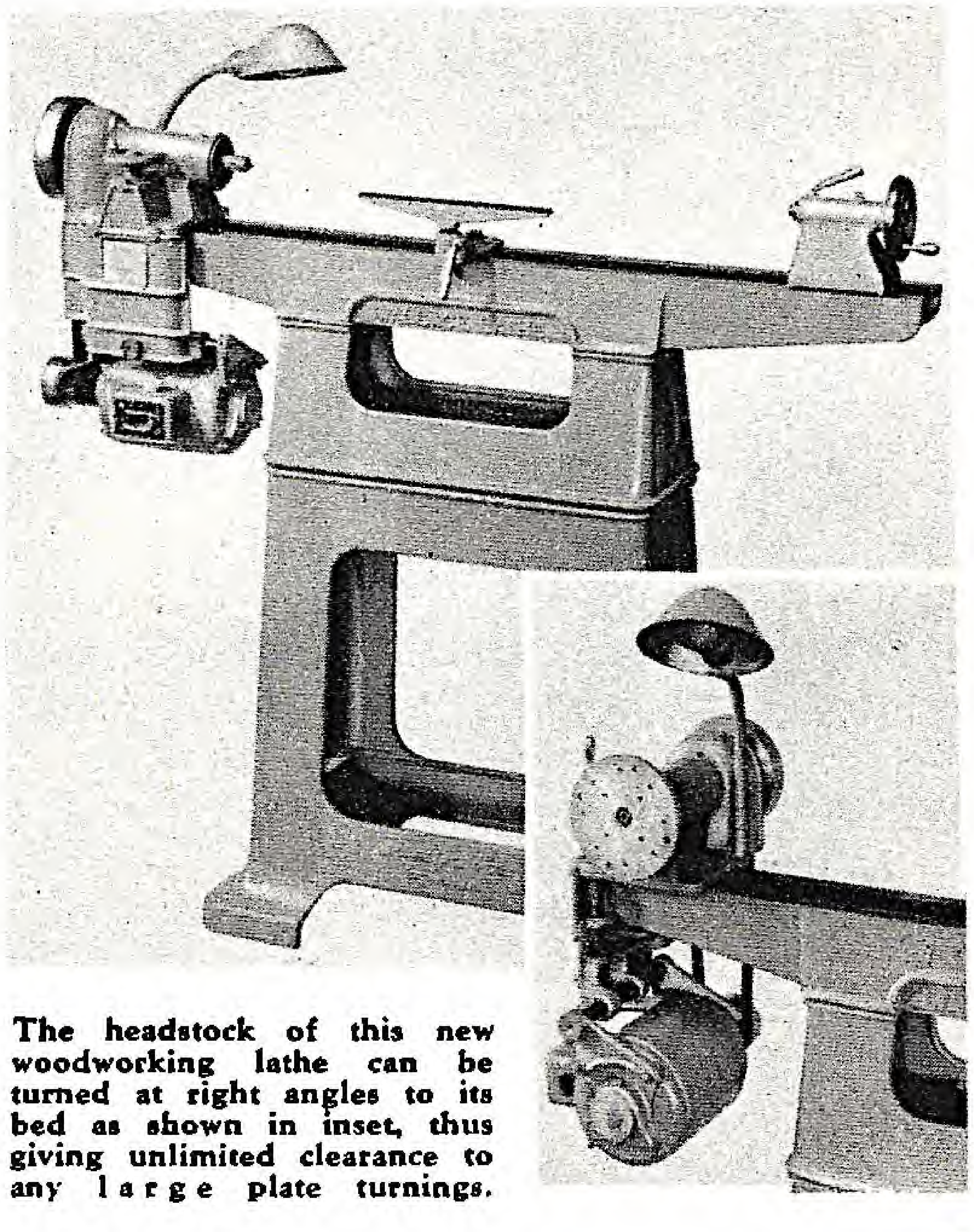
The furnace operates on any domestic gas supply and is as safe to use as the kitchen stove. The high temperature, made possible by the use of the 110-volt motor, easily melts such metals as aluminum, copper, brass and their alloys. The complete unit is small enough to install in the average workshop.

Headstock Swivels At Right Angles

A NEW type of wood working lathe having a headstock that swivels at right angles to the bed easily handles face plate turnings that are too large to clear the bed of a conventional lathe.

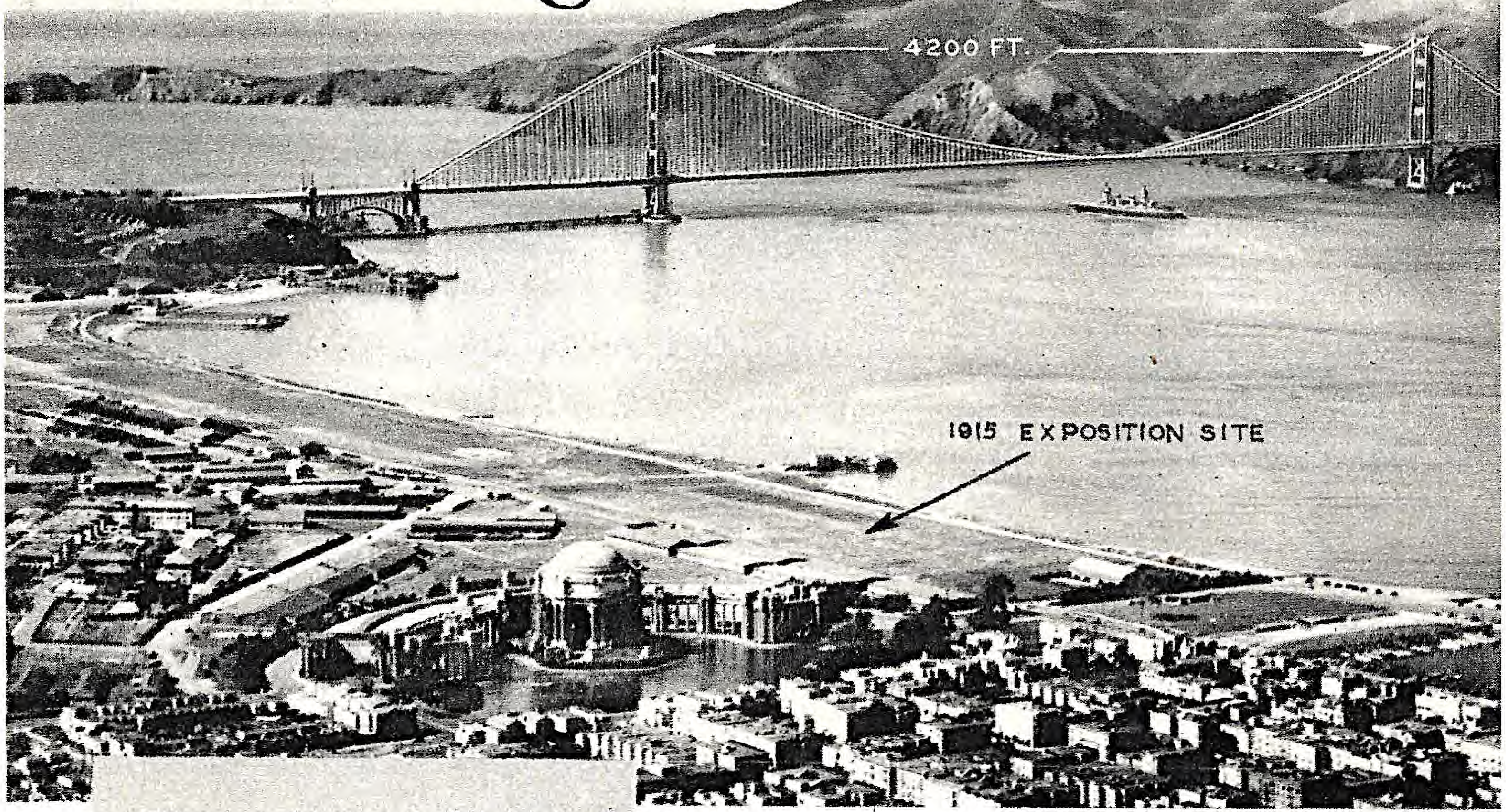
By turning the headstock at right angles to the bed, the face plate has unlimited clearance for turnings of any size. The motor is suspended on a free swinging axis below the projecting end of the bed, permitting it to turn with the headstock.

Nine speeds are obtainable by sliding the motor on its axis to align its three pulleys.



The headstock of this new woodworking lathe can be turned at right angles to its bed as shown in inset, thus giving unlimited clearance to any large plate turnings.

Building Dreams of Steel



World's largest and most magnificent single span suspension bridge over the Golden Gate. It is the first bridge ever to be thrown across a major harbor entrance, and when completed in May, 1937, will form the key link in the proposed All-Pacific Coast Highway System.

They said it couldn't be done—span the Bay and Golden Gate with bridges, but San Francisco did it. And threw in a great Exposition to boot. This story tells how the impossible is accomplished.

THE intricate and wondrously knit glittering spans of the world's two greatest bridges across the Golden Gate and Oakland Bay, and a magic isle of Atlantis—dripping with all the miracles of an international exposition, is what San Francisco is preparing for your coming in 1938-39.

The site of the Exposition lies in the white-capped San Francisco-Oakland Bay area, midway between the two cities, on shoal land located just north of the adjoining Yerba Buena Island. And this year 385 acres of shoal will be filled in to provide the site for the Exposition. By the end of 1936, when the fill is completed, architectural plans for the buildings will also be finished, so that actual construction will begin with 1937.

A "natural" for an airport, you think. And you are right. When the Exposition closes, San Francisco will erect there the last word in up-to-the-minute flying terminals, all within just a few minutes bridge ride to the downtown district, or to Oakland proper.

The unique position of this site—a deep-water island—makes it possible for the merchant and naval ships of every nation to drop anchors a stone's throw away. Or, for exhibition purposes, to berth at the site's piers.

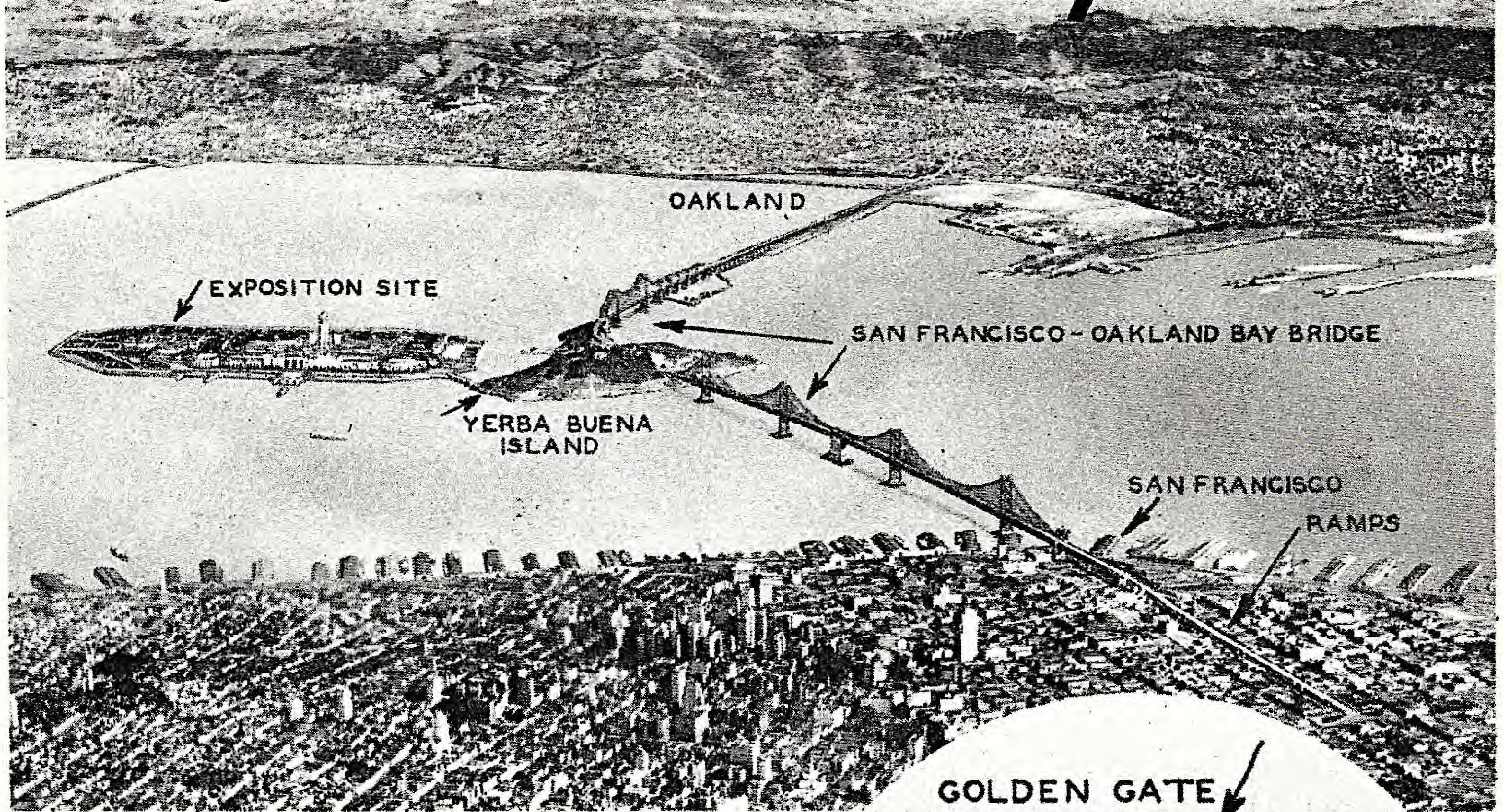
The San Francisco-Oakland Bay Bridge is 8½ miles long—figuring the east and west approaches. The bridge proper, including the island crossing, is 23,000 feet long—approximately 4½ miles.

The western half of the bridge is in reality two complete suspension bridges anchored midway between San Francisco and Yerba Buena Island to a concrete anchorage rising 478 feet from the rock beneath the bay floor. Ship clearance of the bridge is from 200 to 218 feet above the surface of low water.

Fit companion to this giant span, is the Golden Gate Bridge now being built to serve San Francisco and the North Bay Redwood Empire. It will be the world's largest and most magnificent single span suspension bridge, and is the first bridge ever to be flung across a major harbor entrance. Its 746-foot towers support a 4,200-foot span. The famed Eiffel Tower of Paris exceeds the towers of the Golden Gate Bridge by a height of only

In San Francisco Bay

by C. W. GEIGER


OAKLAND
EXPOSITION SITE
SAN FRANCISCO - OAKLAND BAY BRIDGE
YERBA BUENA ISLAND
SAN FRANCISCO
RAMPS

The San Francisco-Oakland Bay Bridge spans the largest navigable body of water yet bridged. No other bridge sweeps so high over the ships below. Over eight miles long, the west half of the bridge is in reality two suspension bridges.

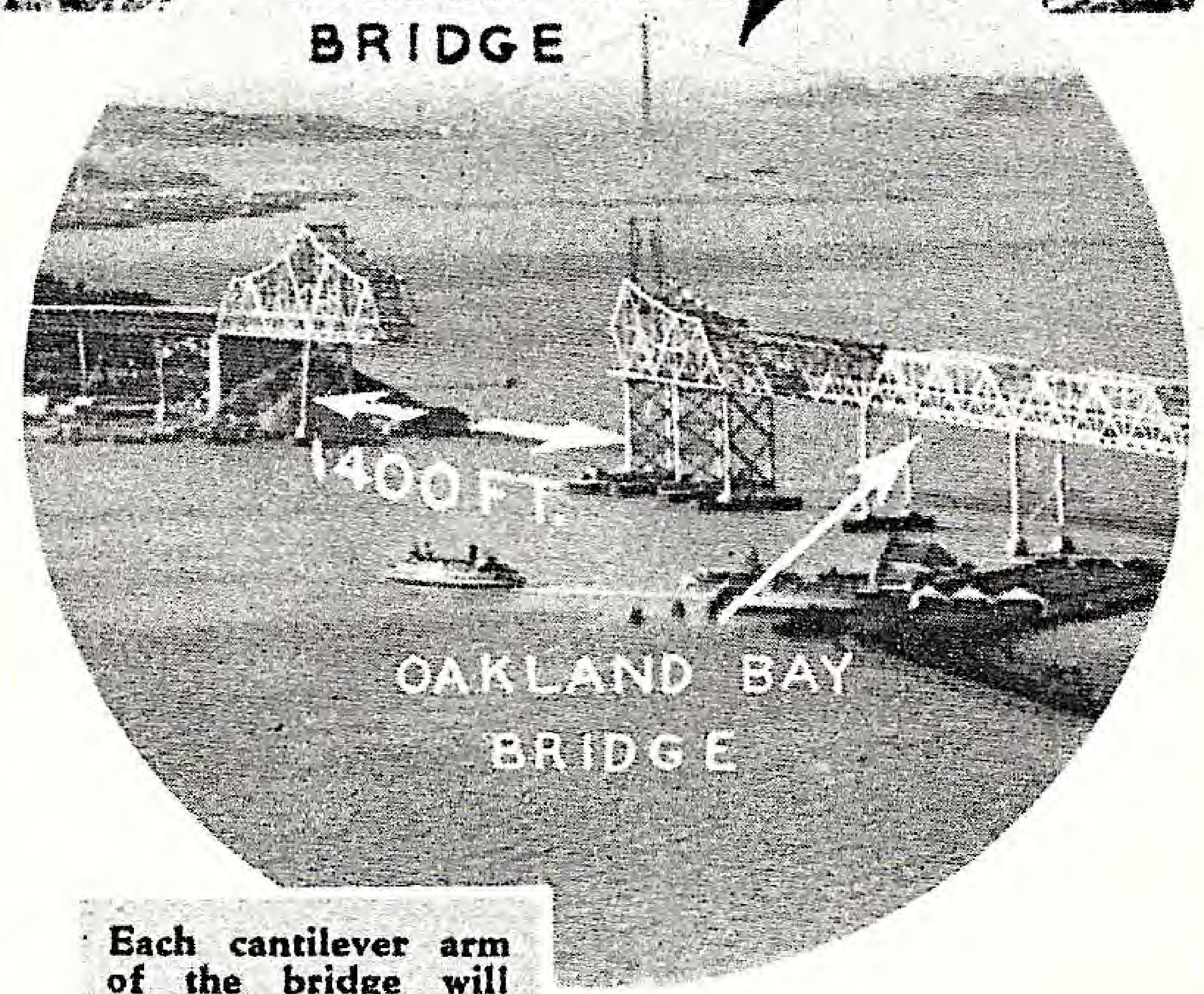
239 feet. Or, to get nearer home for comparisons, the bridge towers are 191 feet taller than the Washington Monument. Thus, then are two mammoth bridges, where one alone might serve. But California always does things in a great big way.

The Oakland commuter today rides on 20-mile-an-hour trolleys to the ferry moles, then spends 20 more minutes ferrying to San Francisco, after which he climbs aboard another trolley to ride uptown to business. Or he comes in on the Sausalito Ferry from the North Bay Redwood Empire, losing even more valuable time.

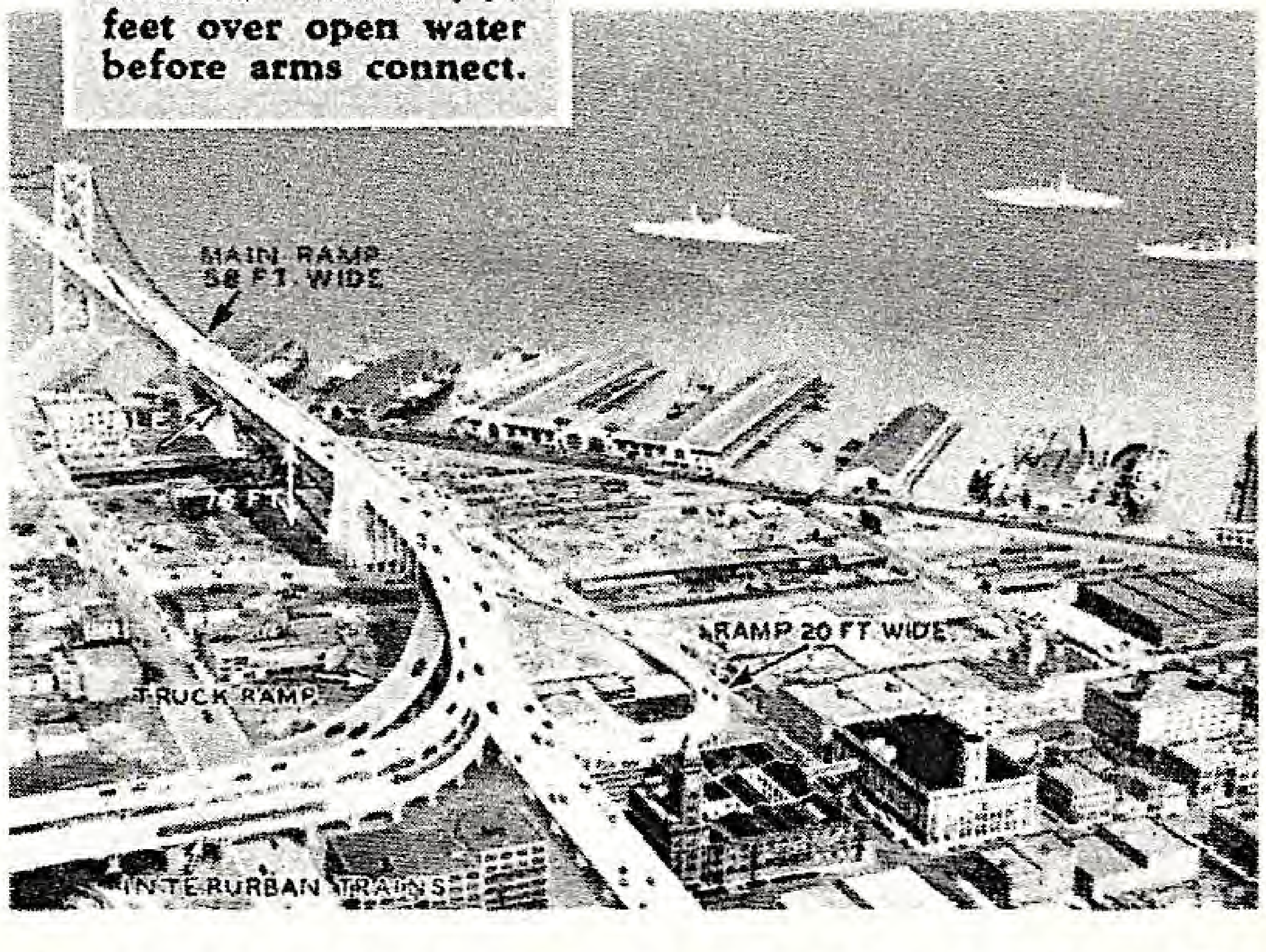
But under special safety control from a point in Emeryville, the Oakland commuter will soon scoot in subway-type trains at 60 miles an hour to a central San Francisco terminal loop, close to his work, thereby cutting his hours of commutation travel more than half.

The San Francisco-Oakland Bay Bridge riggers are engaged in erecting the longest bridge arms ever attempted by cantilevering —literally pushing steel out into thin air. The two arms (see illustration) are now a little more than 400 feet long, which means they are rapidly reaching the danger point.

If nothing goes wrong the connection will


GOLDEN GATE BRIDGE
400 FT.
OAKLAND BAY BRIDGE

Each cantilever arm of the bridge will have to stretch 700 feet over open water before arms connect.


MAIN RAMP 58 FT. WIDE
RAMP 20 FT WIDE
TRUCK RAMP
INTERURBAN TRAINS

South of Market Street as it will appear in 1938. The bridge comes into San Francisco at a height of 175 feet, and the unique ramps permit traffic to flow in every wanted direction, as shown in the illustration above.

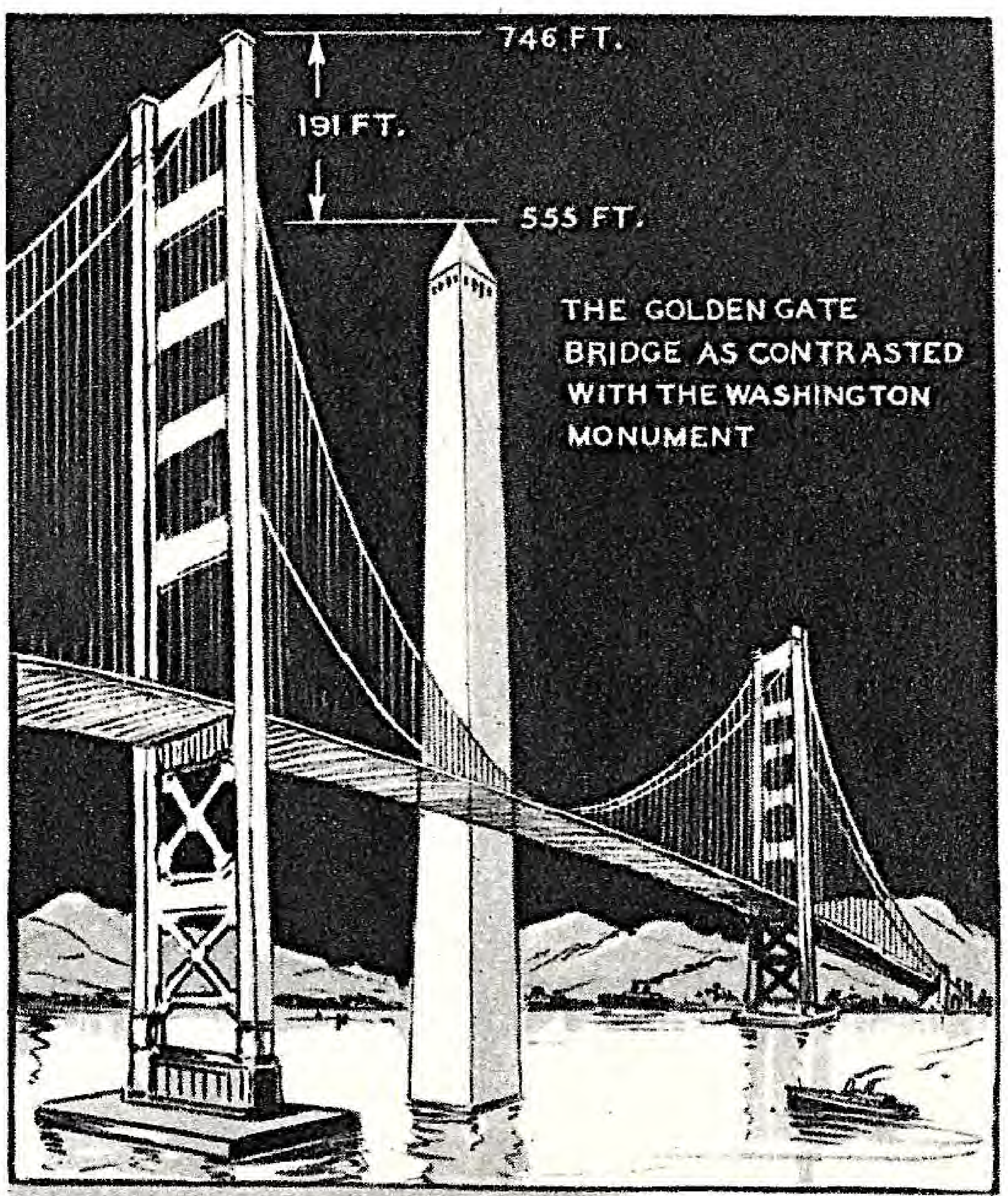
You Won't Have to Wait at the Golden Gate

be made in a little over a month, but right now the bridge men have their fingers crossed.

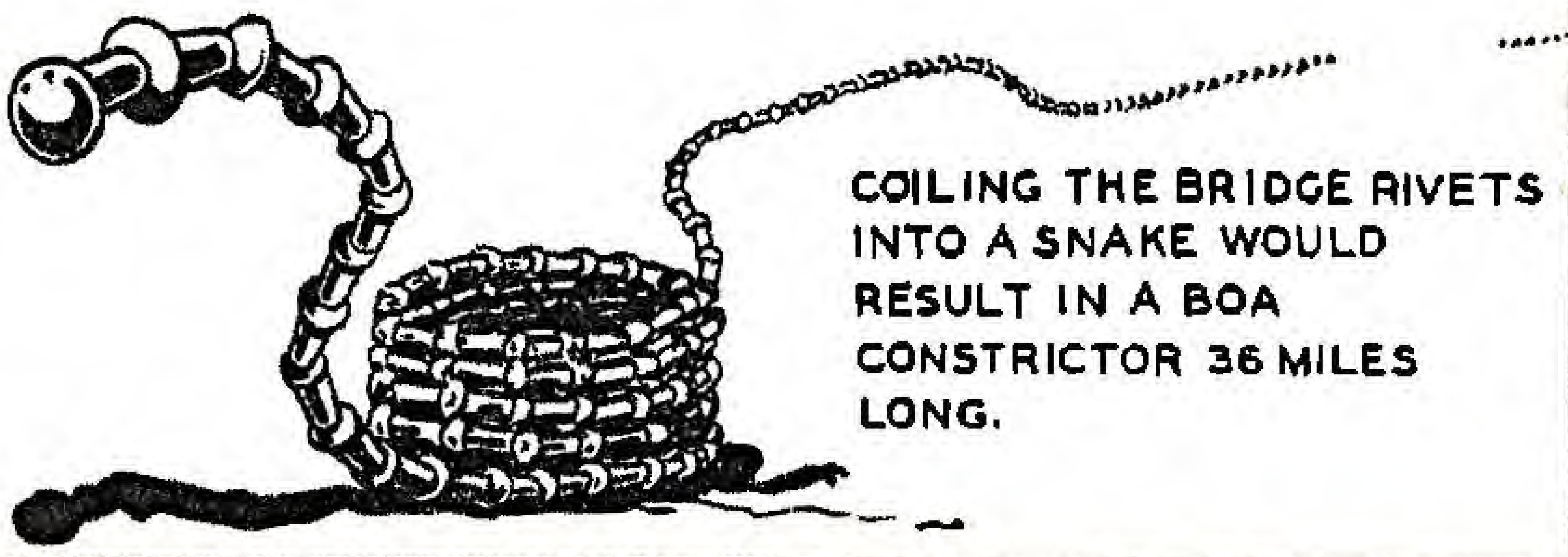
On top of this comes another problem—that of stretching out thousands of tons of steel into space so that the "sag" due to gravity will be equalized. You and I think these great arms are being built parallel to the water, but we are wrong. They are tilted so that the outward ends of the bridge are about four feet higher than the level at the starting piers. In other words, the "sag" has been so calculated that the enormous weight of the free-floating steel bends it downward, and thus the two bridge sections will eventually join without a detectable difference in plane.

What could be more wonderful than to commemorate the completion of these two great bridges with an International Exposition?

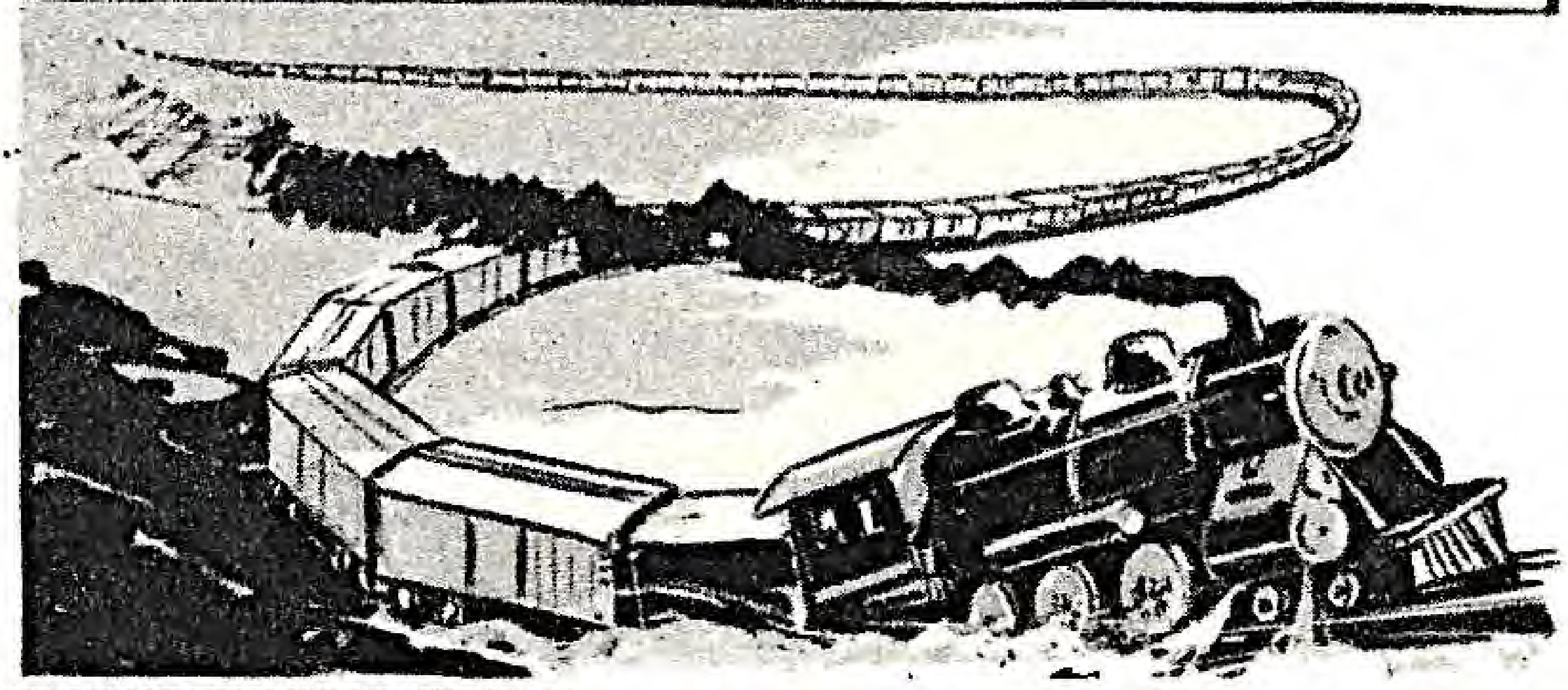
For the Exposition will be international in scope. Its theme will be modern developments in transportation and communication as symbolized by the bridges, by the transoceanic air service and the progress of radio.


746 FT.
191 FT.
555 FT.

THE GOLDEN GATE BRIDGE AS CONTRASTED WITH THE WASHINGTON MONUMENT

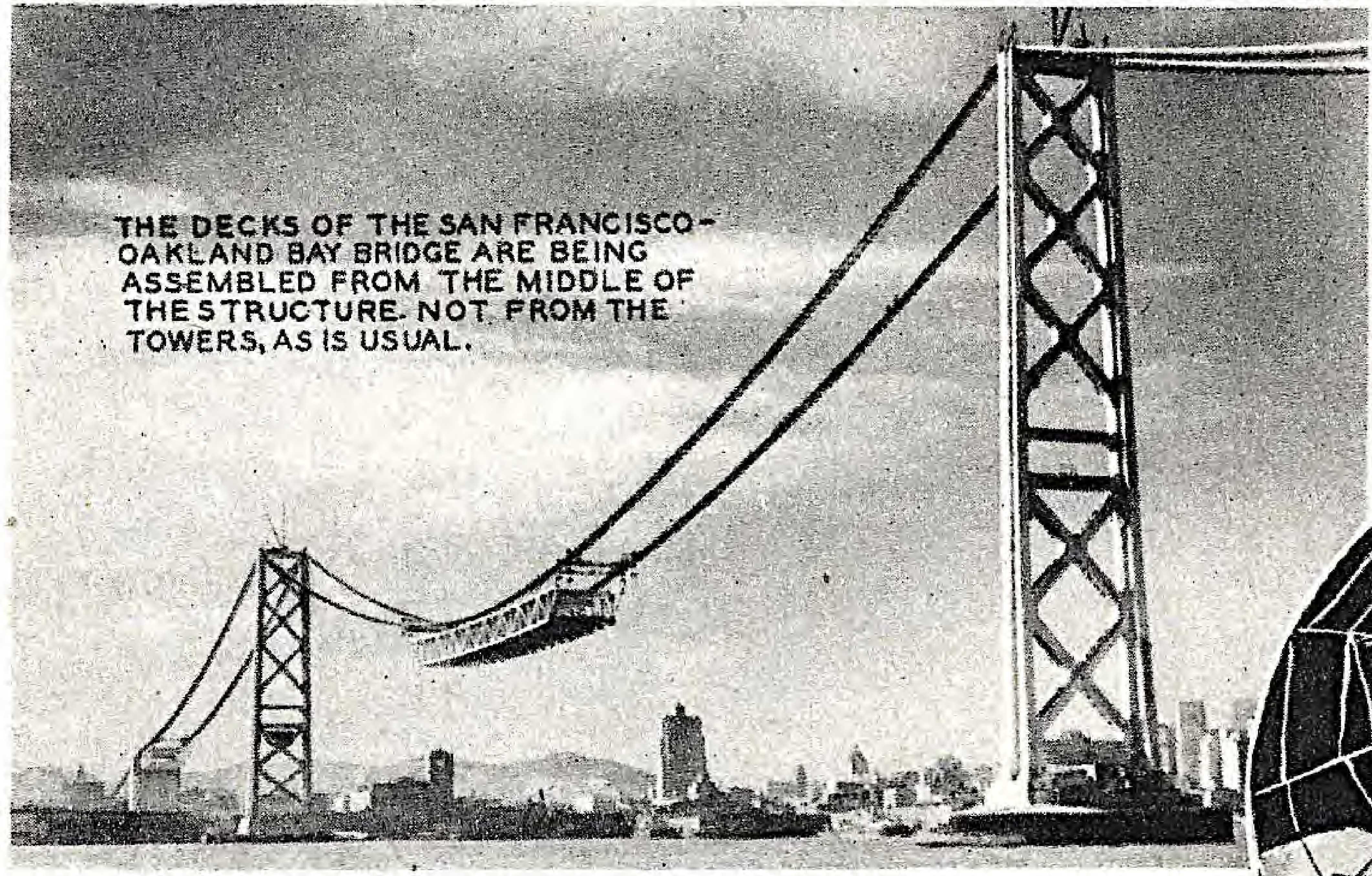


COILING THE BRIDGE RIVETS INTO A SNAKE WOULD RESULT IN A BOA CONSTRICTOR 36 MILES LONG.

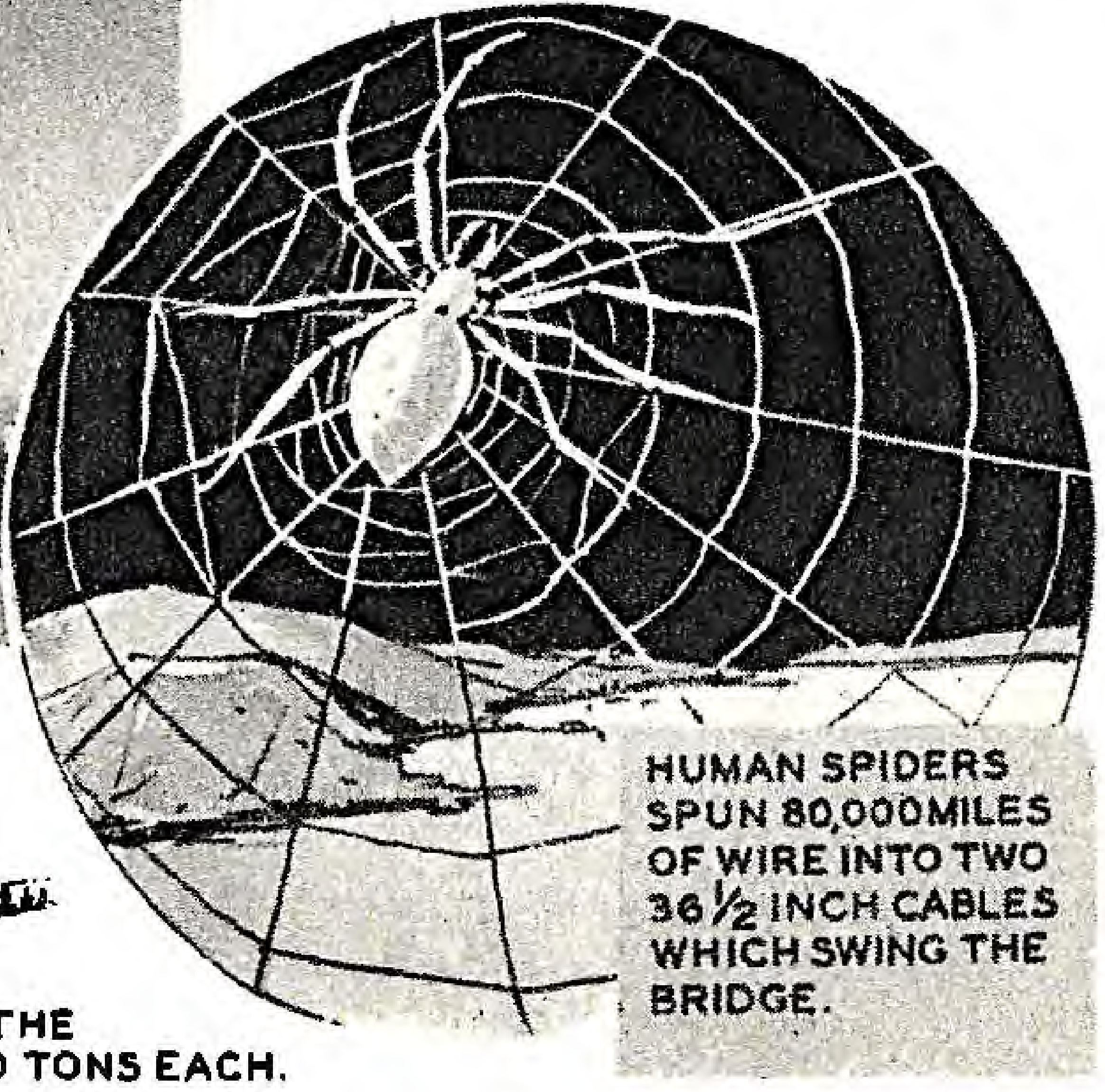


THE STEEL USED IN THIS BRIDGE WOULD LOAD A FREIGHT TRAIN 20 MILES LONG.

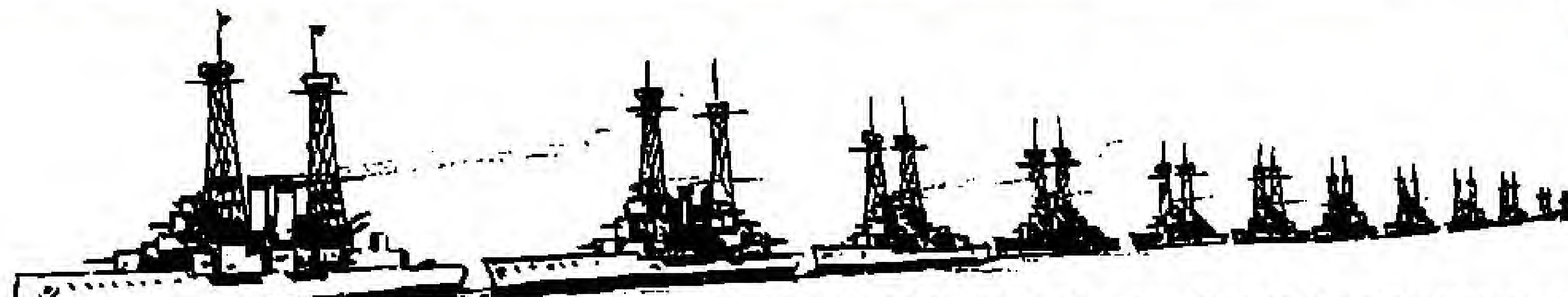
Sixty years ago, a few impractical San Franciscans had an impossible dream. Some day, they said, bridges would span the waters of their beloved city. Today these men are gone, but their crack-brain ideas have crystalized into an actual fact.



THE DECKS OF THE SAN FRANCISCO-OAKLAND BAY BRIDGE ARE BEING ASSEMBLED FROM THE MIDDLE OF THE STRUCTURE. NOT FROM THE TOWERS, AS IS USUAL.

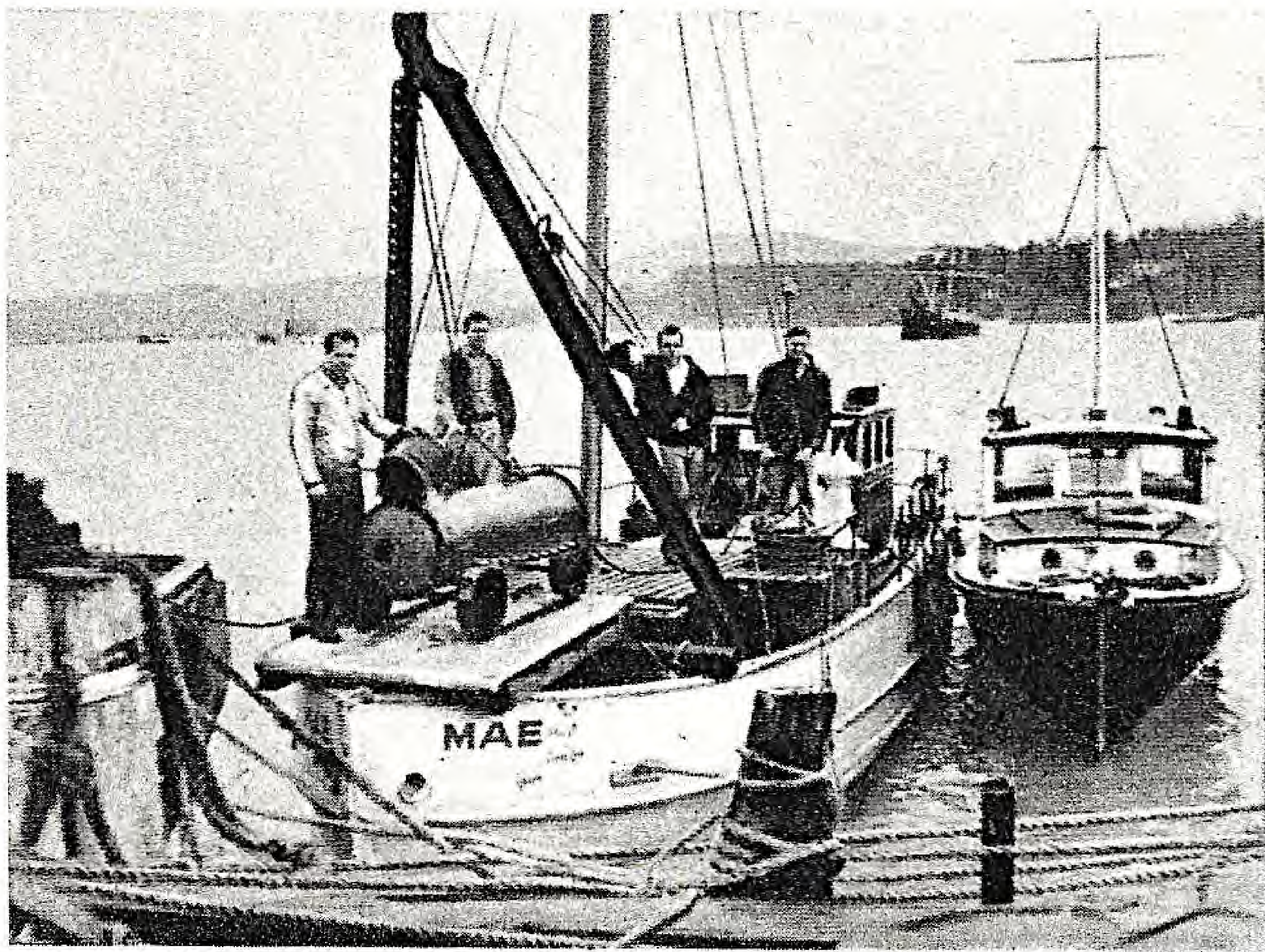


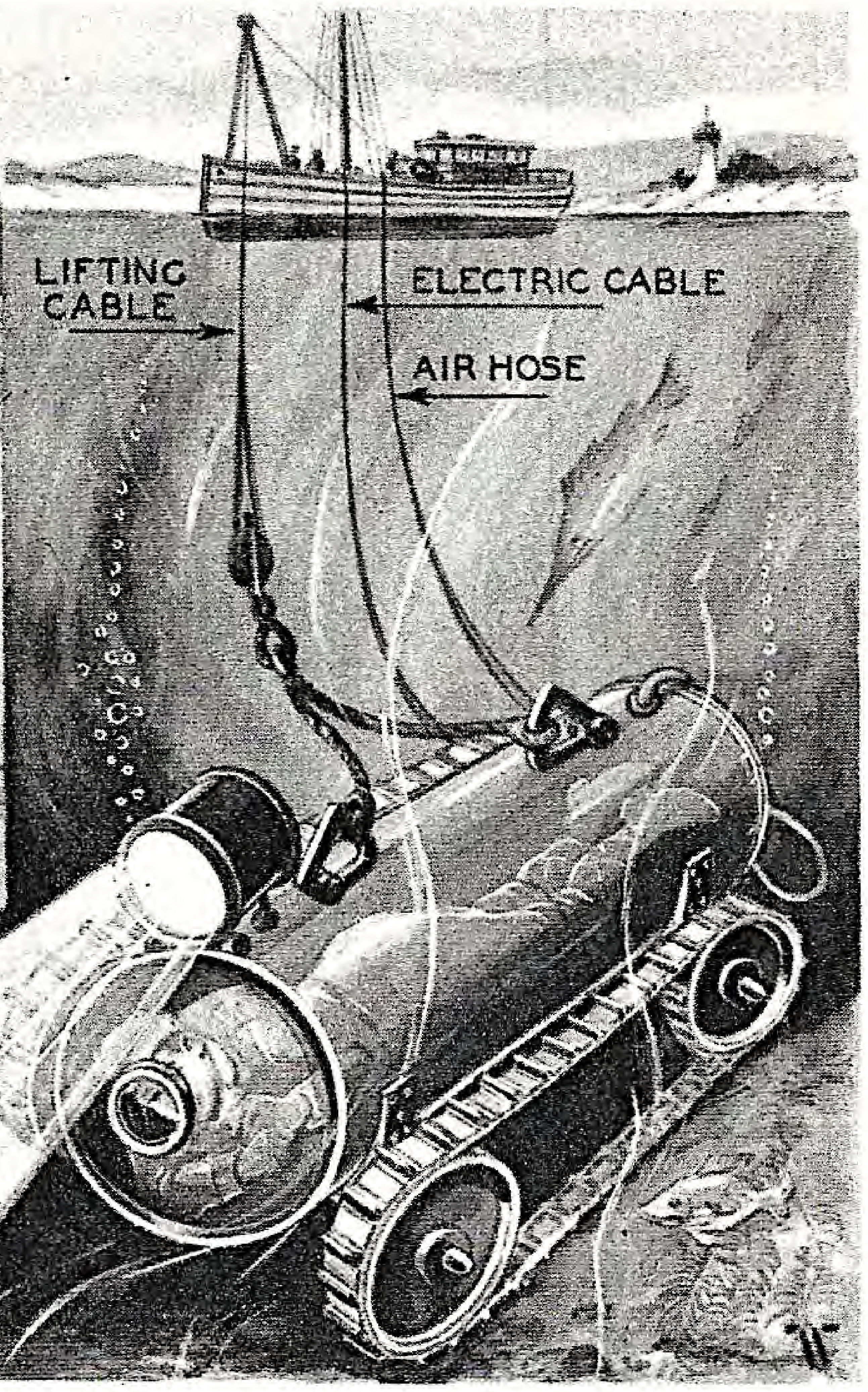
HUMAN SPIDERS SPUN 80,000 MILES OF WIRE INTO TWO 36 ½ INCH CABLES WHICH SWING THE BRIDGE.



CONCRETE USED FOR THE BRIDGE EQUALS THE DISPLACEMENT OF 10 FIRST LINE BATTLESHIPS OF 33,000 TONS EACH.

Tractor-Sub Cruises On Ocean Floor





Far more mobile than a diving suit is this submarine tractor shown on deck of her tender. Designed for under-sea exploration it will be operated as shown at right.

FAR below the surface of San Francisco Bay a submarine tractor, manned by a single occupant, is crawling over the ocean floor, searching for sunken treasure. The tiny machine, a miniature of the tractorsphere published on the January, 1935 cover of MODERN MECHANIX & INVENTIONS Magazine, marks a distinct advance in submarine exploration.

Halley Hamlin invented and built the machine to assist him in the recovery of $103,000 in gold and lead which was lost 23 years ago with the sinking of a river vessel. It is operated by electricity supplied by a floating tender, which also serves to raise or lower the tractor as desired. At all times the operator of the under-sea explorer is in telephone communication with the tender.

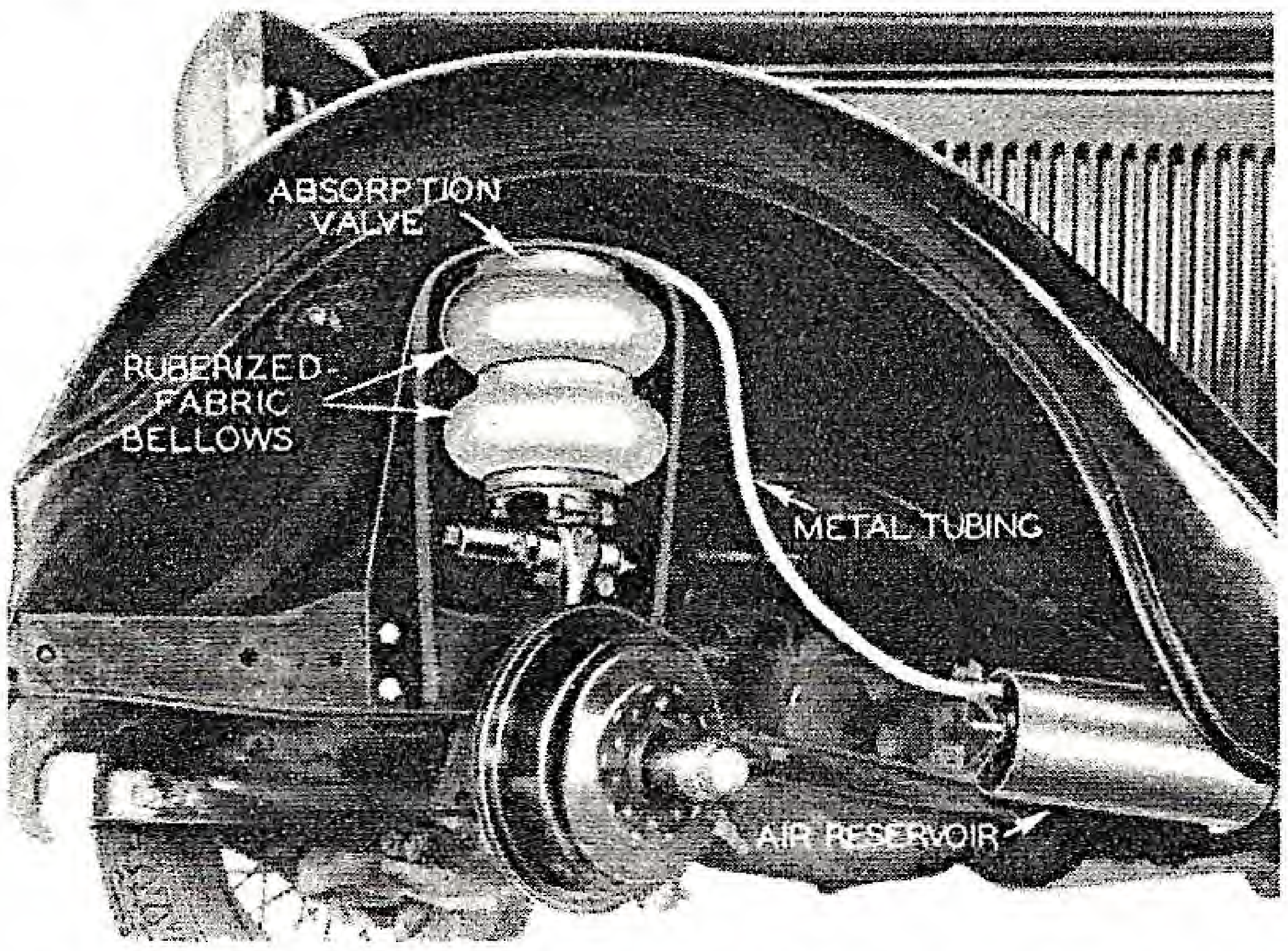
The big advantage in the tractor lies in its ability to travel over the ocean floor much more rapidly than could be done with a regulation diving suit.

Electric Eye Seeks Cure for Colds

A NEW electric eye, sensitive only to a narrow band of invisible ultra-violet rays, has been placed on the trail of the common cold by Prof. Robert Cashman of Northwestern University. This invisible band of rays, called therapeutic rays, is known to have a definite influence on a person's resistance to disease, and with the aid of the new machine Professor Cashman hopes to soon find the cure for common colds.

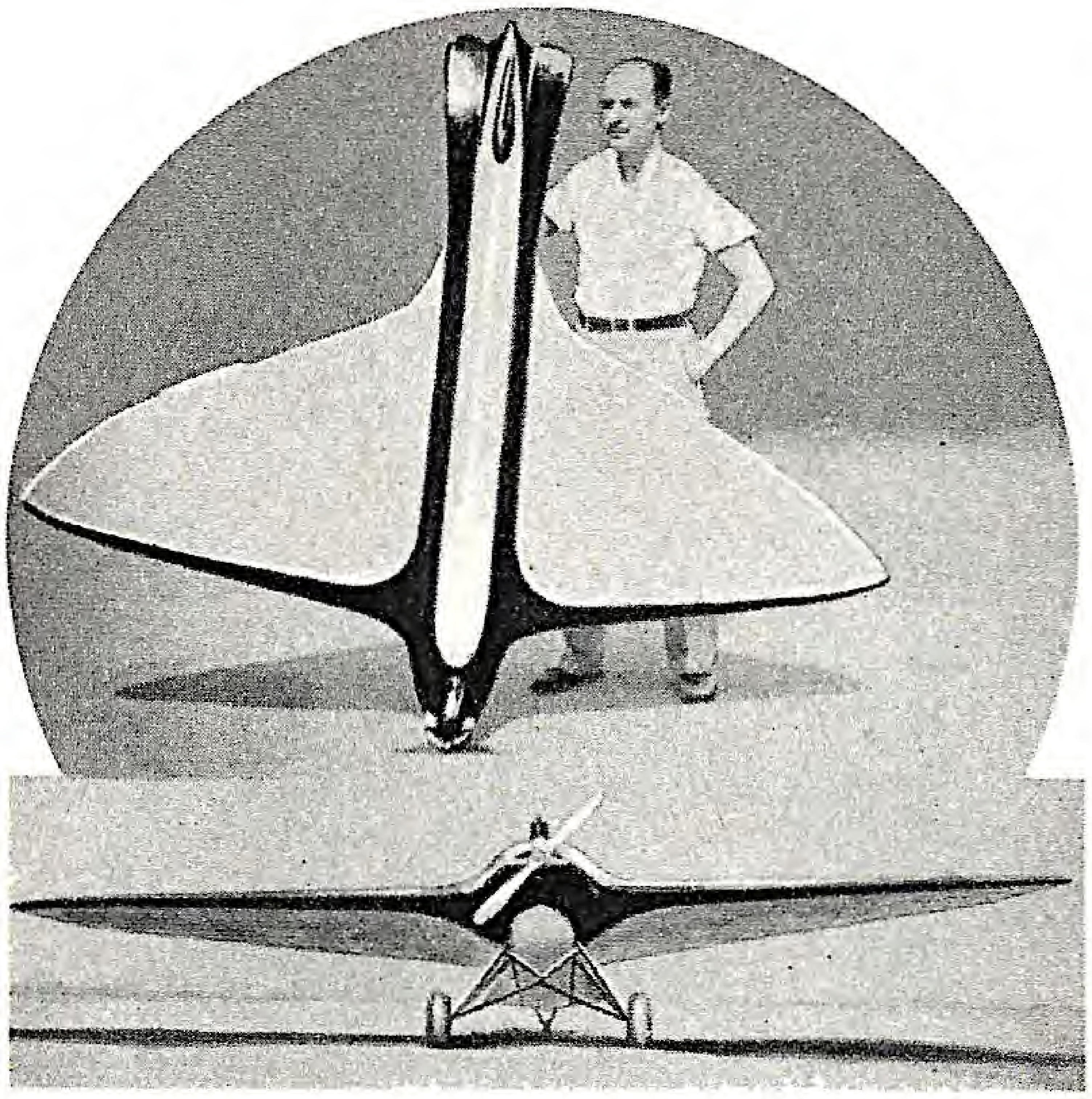
Air Cushions Replace Metal Springs

AUTOMOBILES riding on cushions of air have become a reality as the result of a newly invented spring in which rubber bellows replace metal spring leaves. Just as pneumatic tires absorb shocks between wheel and road, so do the new bellows absorb shocks between wheel and car body.



Greater ride stability is claimed for this new type of air spring. On sharp bumps, the bellows absorbs the shock, permitting escape of excess air through absorption valve into the reservoir, where it is compressed and later restored.

Bat-Winged Plane Increases Modern Aircraft's Safety



Featuring a wing constructed in bat-like fashion this odd model plane is claimed to eliminate tail spinning and stalling. The inventor contemplates building a full size plane shortly.

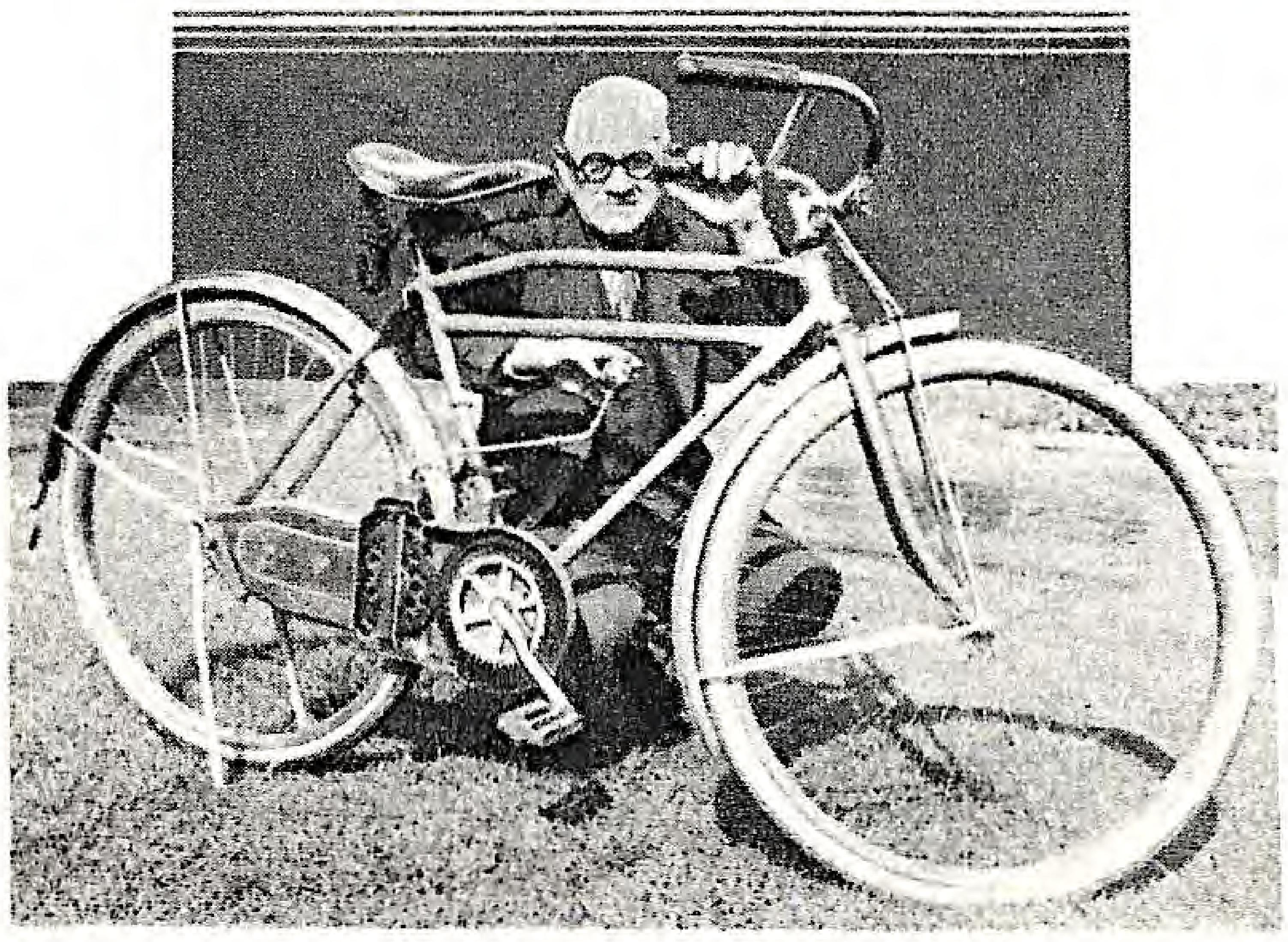
OFFERING safety features that eliminate stalling and spinning a new bat-winged plane recently made its appearance in model form at Los Angeles, California. The inventor of the strange craft, whose name has not been disclosed, has already applied for patents to cover its many features.

In tests conducted with the six-foot model it was found that the bat-wings offered other features including very low landing speeds and ability to carry 25% more weight than crafts of similar size. Due to the streamlined design employed in the construction, the plane is capable of very high speeds since wind resistance is reduced to a minimum. The model was constructed in much the same manner as the ordinary model airplane and powered by miniature gasoline driven engine.

Gear Shift Simplifies Bike Riding

REALIZING that propelling a bicycle up hill was very often a trying task, William E. Sperry, of San Diego, California set about to construct a vehicle that would eliminate this objectionable feature. Using a standard make bicycle Mr. Sperry developed a gear shift attachment which he believed would be welcomed by all cyclists since it has done away with all unnecessary pedaling.

When the rider reaches a hill he merely pushes the gear shift into the low position and continues to ride to the top without any additional effect.



No longer is it difficult to ride a bicycle up hill provided it is equipped with a gear shift like the one shown here. The inventor, William E. Sperry, points out the gear shift control.

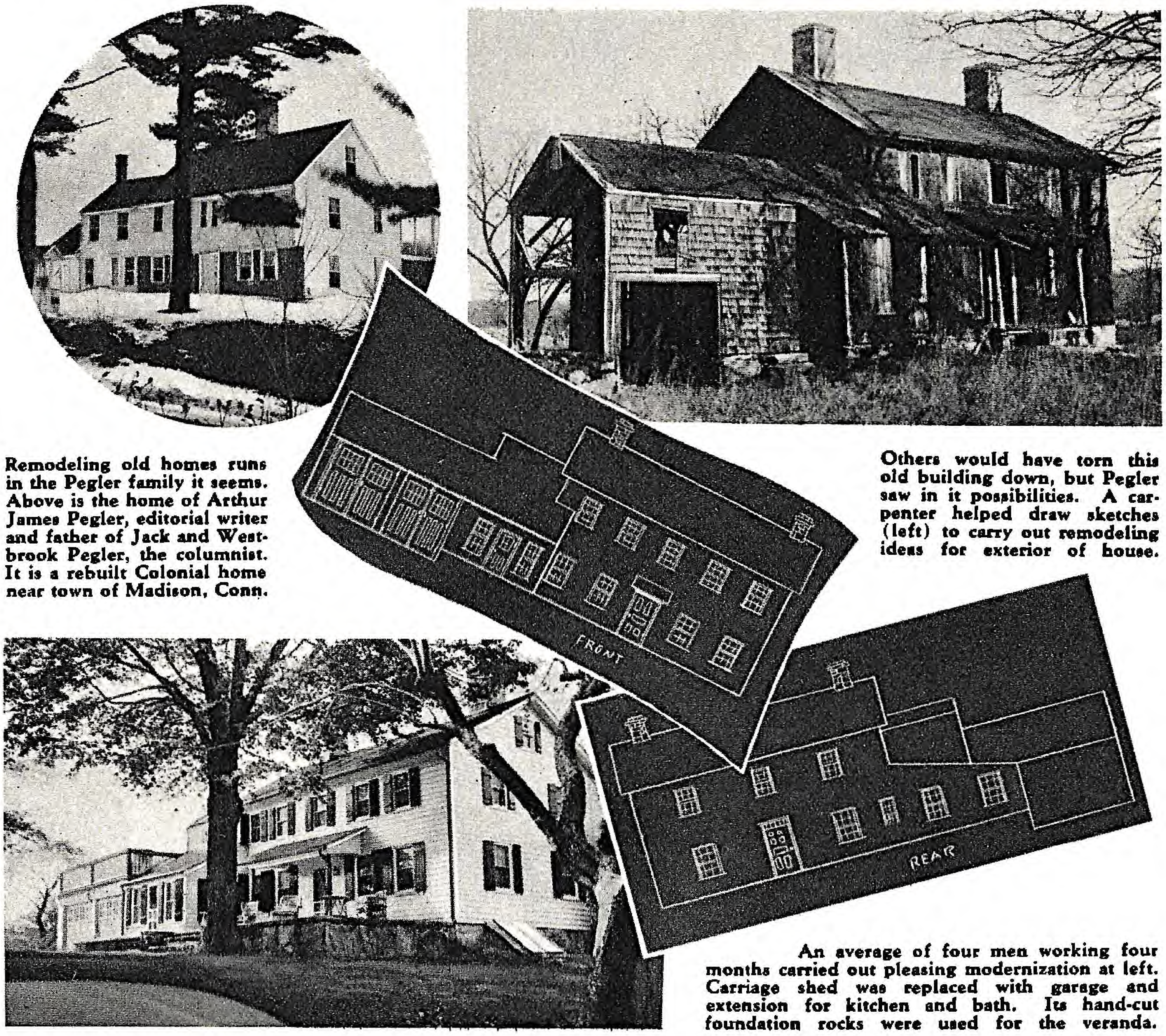
Electric Voice Reaches All Rooms

Permitting an executive to address the personnel of his firm this compact inter-department calling system, requiring a small space in his office, eliminates inter-office correspondence.

CONTAINED in a cabinet no larger than an electric refrigerator a new and revolutionary personnel address system has been introduced by a leading American telephone manufacturer. The system, especially designed for school and department store use, permits the principal or executive to address one room or department or the entire student body or faculty without leaving his desk. If desired he may address one particular department or room or a group of rooms.

The address system is so constructed that by simply throwing a switch the speakers become microphones permitting the executive or school head to listen in on the conversation in any room or department.

Colonial **RUIN** *Becomes Charming* **HOME**



Remodeling old homes runs in the Pegler family it seems. Above is the home of Arthur James Pegler, editorial writer and father of Jack and Westbrook Pegler, the columnist. It is a rebuilt Colonial home near town of Madison, Conn.

Others would have torn this old building down, but Pegler saw in it possibilities. A carpenter helped draw sketches (left) to carry out remodeling ideas for exterior of house.

An average of four men working four months carried out pleasing modernization at left. Carriage shed was replaced with garage and extension for kitchen and bath. Its hand-cut foundation rocks were used for the veranda.

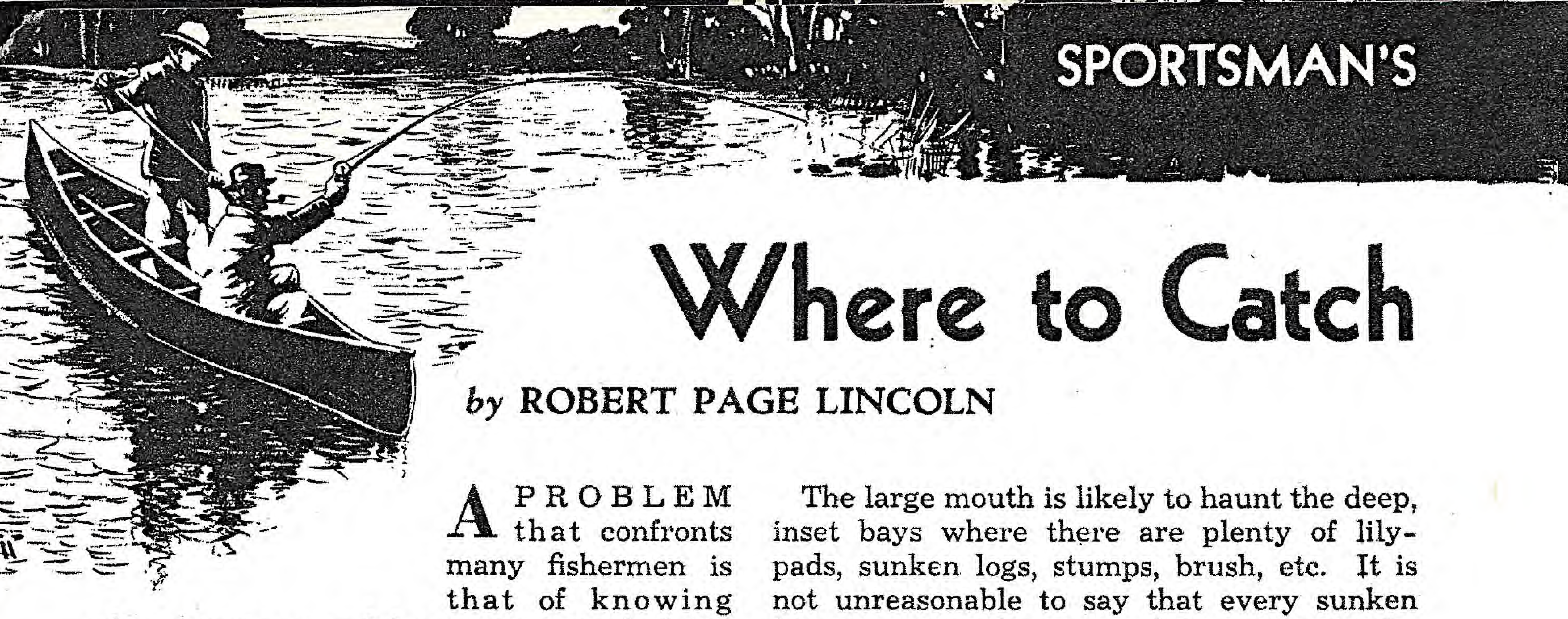
FOR years Jack Pegler, account executive of the Lord and Thomas advertising agency in New York City, watched wind, rain, snow, and the burning sun wreak havoc on an old building. Yet in that dilapidated house, which hundreds of others would have scorned, he visioned his ideal of a home in the country.

His idea was so clear in his mind, that, after he had purchased the two-story frame structure on a plot of land near Pound Ridge in Westchester county, north of New York City, he did not need the professional services of an architect. One evening he sat down with a local carpenter and sketched out a crude drawing of his home as he wanted it to be. The results show the possibilities of remodeling old buildings without excessive expense.

The house, built in pre-Revolutionary days, was, in spite of its age and appearance, in sound condition. Pegler preserved the shingle sides with a few coats of paint, put in new sashes and shutters and added a garage and veranda.

It was in the interior that Pegler made the greatest changes. Old walls were torn out to enlarge rooms. New plaster was sunk deep between the old, hand-hewn timbers to produce a pleasant beam effect. The problem of lighting was solved by sinking metal fixtures for electric lights in the ceiling. Uneven widths of oak were pegged and laid on the first floor, while maple was used on the second.

The old fireplaces, chimneys, smokehouse on the second floor, and Dutch oven in the basement were retained.



Where to Catch

by ROBERT PAGE LINCOLN

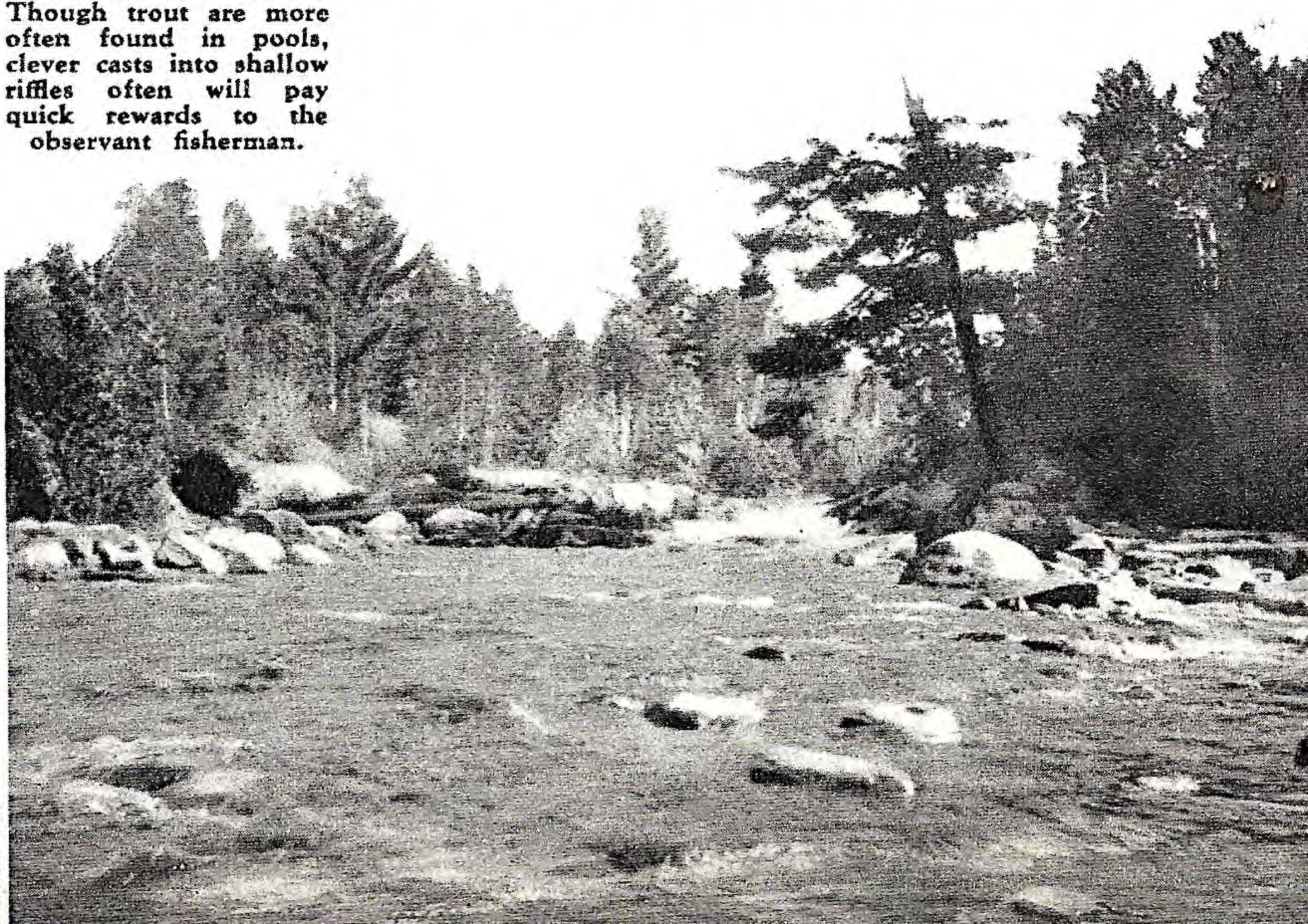
A PROBLEM that confronts many fishermen is that of knowing where to go on a lake or river to find the various species desired. Knowledge of where these fish keep themselves, not only according to the time of season but to the time of day, is the keynote of successful fishing. One can then go to almost any water and find the desired locations with agreeable results.

The large mouth black bass is the chief game fish sought by the fishermen. Unlike the small mouth bass, the large mouth is a lake or pond fish. Its food consists chiefly of minnows that it finds in the shallow water and in among the vegetation. Small sunfish, perch and other small fish are also taken as food by the large mouth. One of the most successful live lures for bass is the baby bullhead with its spines snipped off with a pair of scissors. It is hooked in the skin just back of the dorsal (back) fin and is permitted to swim around.

The large mouth is likely to haunt the deep, inset bays where there are plenty of lily-pads, sunken logs, stumps, brush, etc. It is not unreasonable to say that every sunken log in an inset bay is good for a bass in the summer. They like to lie in the shade of these logs or obstructions, and if your lure is presented to them without stimulating their fear and suspicion, a catch is almost certain. I would say that logs and stumps in the water are two of the safest bets in fishing for the large mouth black bass.

You will find the bass in the bays, among the pads and vegetation, in the very early morning in the summer. As the sun mounts they quit such locations and move into deep water. By ten o'clock you are more likely to find them outside of the inset places as stated, in from fifteen to twenty-five feet of water, where long growing weeds thicket the bottom and reach toward the top. Here a live frog should be used. Oddly enough in such fishing a common cane pole is as good, if not better, than a bait casting outfit. A bobber is used on the line and the lure is kept about four or five feet off of the bottom. Row silently along, moving the frog in an up and down motion, making as little sound as possible.

In the hot weather of July and August you will find the large mouth bass in the



Left—Robert Page Lincoln went down deep to catch this huge lake trout in Lake of the Woods on the Minnesota border. Below—Water like this is a typical trout habitat. Though trout are more often found in pools, clever casts into shallow riffles often will pay quick rewards to the observant fisherman.

Big Fish

The lakes and streams are full of fish this season, but only if you know where to look for them. This article tells you where to look and how to catch your share.

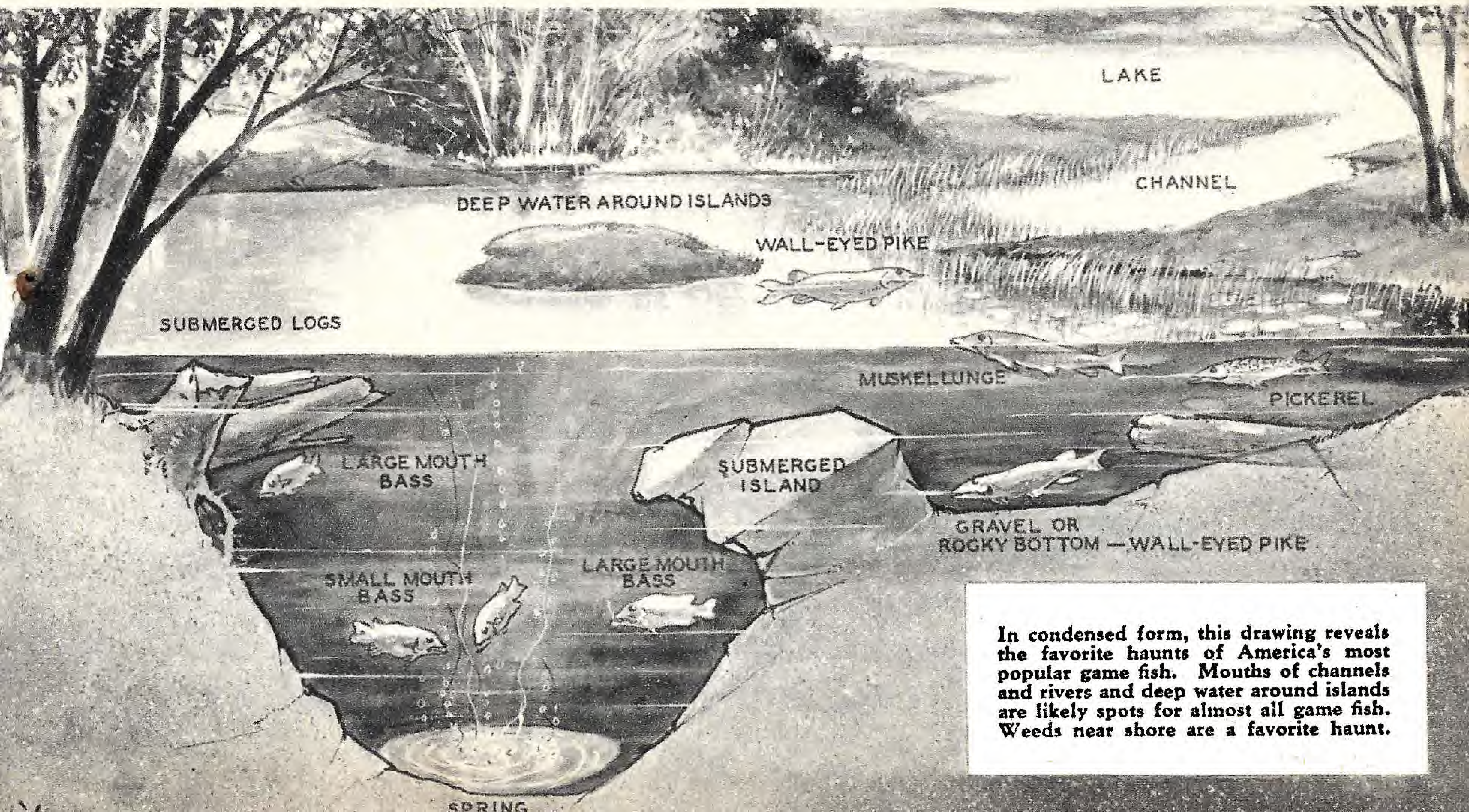
habit of schooling up, often as many as fifty or more in a school. At such times they are likely as not to be found off of the reefs or sunken islands in the lakes. These places are generally told by weeds coming up to near the surface where there is deep water all around. The frog is let down fifteen or twenty feet, or according to the depth of the water, and the same slow-rowing process is followed up. Generally if a school is located the limit can be taken in short order. Use medium-sized frogs. When a bass takes the frog he will do so by holding on to the legs and will make a "run" with it, just as a dog does with a bone. He will then stop, and will seek to turn the lure preparatory to swallowing it head first. Generally one counts ten after the bass has definitely stopped swimming with the lure, and then sets the hook. Almost invariably is the bass then hooked. If the hook is set before the bass turns the frog it will be jerked out of the mouth.

After a day spent in deep water the bass will begin to drift back into the inset bays and shallows at about four o'clock in the afternoon, and continue feeding on into the night often until ten and eleven o'clock. Evening fishing is best with top-water baits, those that boil up the surface, and which delude the fish into believing the lure is some animal swimming. Bass bugs, as used with the fly-rod, are also of exceptional merit at this time.

The small mouth black bass is mostly found in streams, but often, too, in lakes. It does not care much for weedy waters, but clings around those places along the shores where there are rocks and boulders. A pikie type of minnow plug and a pork rind lure are both unexcelled for small mouths.

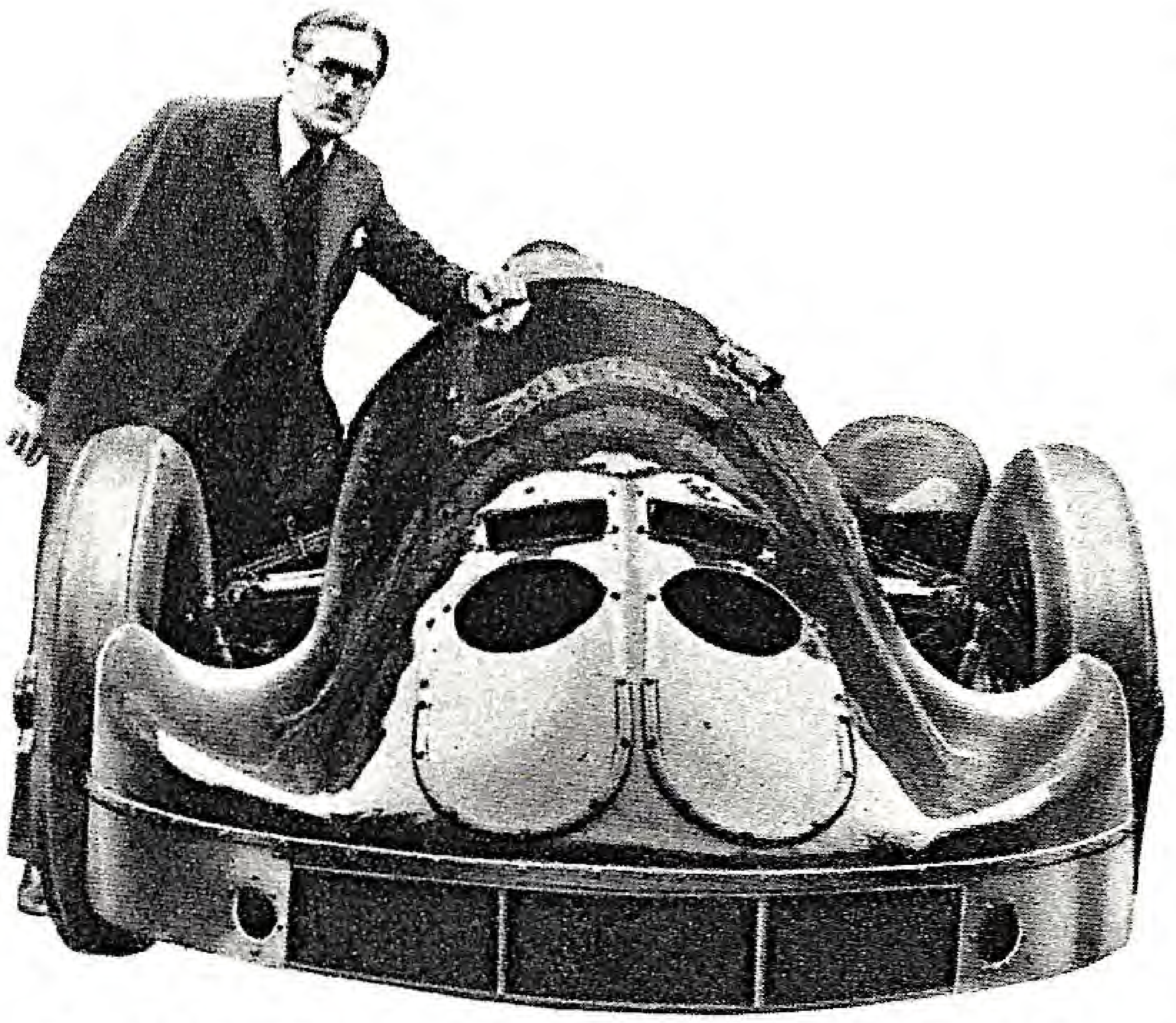
The small mouth bass is much adverse to staying in shallow water after the sun is high. While the large mouth goes down in the

[*Continued on page* 126]



In condensed form, this drawing reveals the favorite haunts of America's most popular game fish. Mouths of channels and rivers and deep water around islands are likely spots for almost all game fish. Weeds near shore are a favorite haunt.

British Speed Demon Builds Diesel-Powered Racing Car



Capt. G. E. T. Eyston, one of the world's most daring speed drivers, is shown here with his new Diesel-powered racer, "Flying Spray." He expects to set new speed marks with her.

SPEEDS faster than any yet attained from Diesel power are expected of the new Diesel motored racing car built by Capt. G. E. T. Eyston, of London, England.

Captain Eyston, who has been exceeded in speed only by Sir Malcolm Campbell, has embodied many radically new features in his car, which he calls the "Flying Spray." Chief of these is the new type of Diesel motor upon which Captain Eyston is relying for his new speed marks. Details of the improvements are closely guarded.

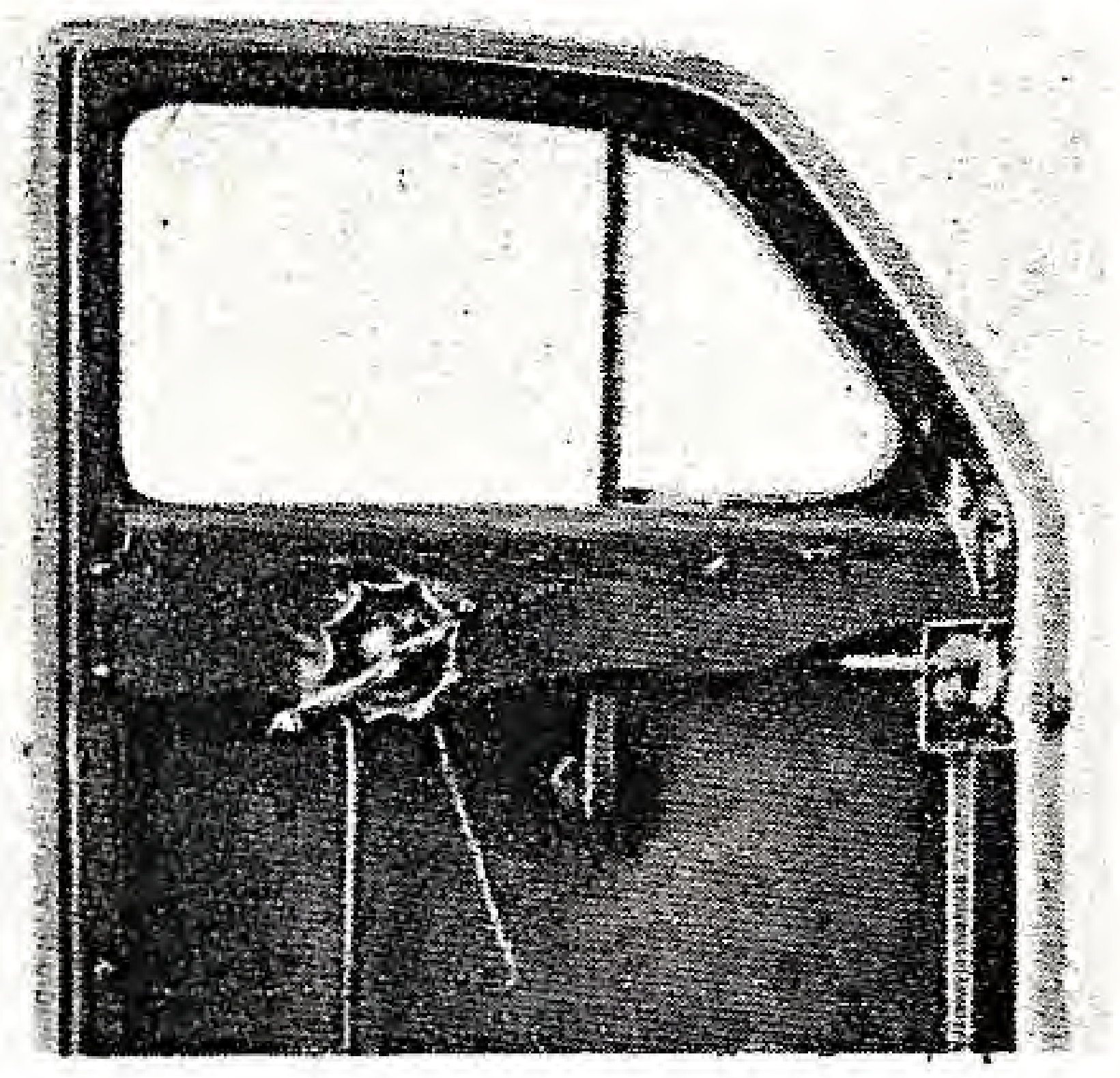
Last year Captain Eyston brought his famous car, "Speed of Wind" to the Bonneville salt flats in Utah and set a record of 167 miles per hour.

"Circus of Science" Goes On Road

WHAT amounts to a world's fair on wheels, consisting of a caravan of 28 show trucks, has been placed on the road by General Motors Corporation as an educational exhibit.

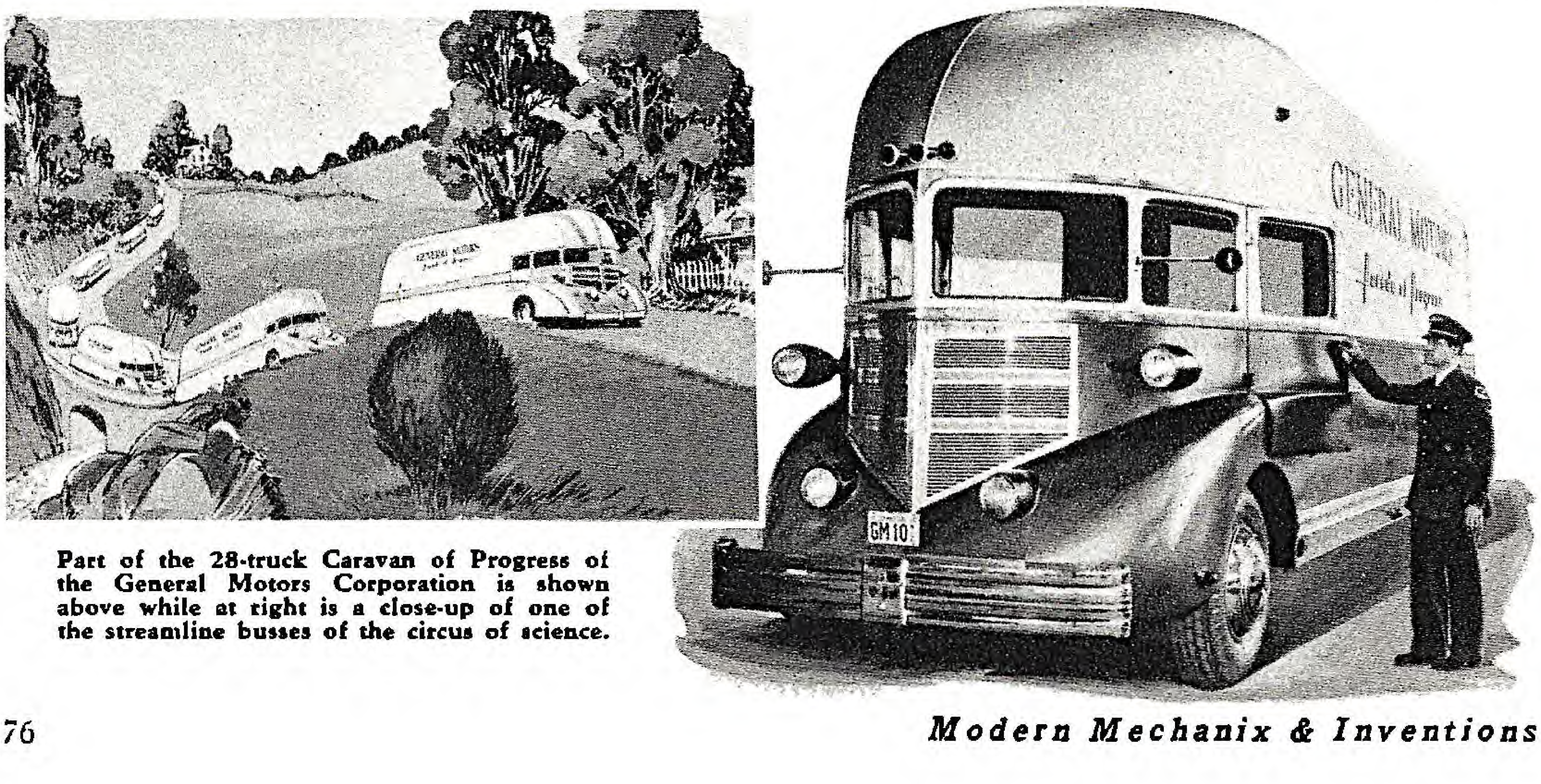
The "circus of science" will tour the country demonstrating the part the laboratory plays in modern industry. Such mechanical marvels as the oscillograph, which analyzes sound; the stroboscope, the induction furnace, which brings water to a boil on a cold stove, and other seemingly impossible devices will be shown. One device will measure the expansion of a steel rail when a person's hand has been placed upon it.

Handle Opens Door; Raises Window



The handle of this car door raises the windows when turned, and opens the door when pulled in.

A POSITIVE acting door lock combined with a window raising handle has been invented for automobiles by F. A. Falk, a jeweler of Stacyville, Iowa. When the handle is turned, the window is raised or lowered by chain action. When the handle is pulled in, the door catch is cocked back, and released like a gun trigger when the door is closed.



Part of the 28-truck Caravan of Progress of the General Motors Corporation is shown above while at right is a close-up of one of the streamline busses of the circus of science.

First Cash Prize Winners Announced in $50.00 Needed Inventions Contest

"SO SIMPLE it is a wonder no one ever thought of it before."

That was the unanimous decision of the judges in awarding the first prize of $25 in the first of the monthly MM Needed Inventions Contest to W. H. Phillips of Dallas, Texas, for his suggested typewriter improvement.

Each month MODERN MECHANIX AND INVENTIONS MAGAZINE is presenting 10 prizes to readers sending in the best suggestions for the most needed inventions of today. These inventions need not be of a technical nature, for actually the most needed inventions are simple, little things that would make work in the kitchen, workshop, or any field of life easier and more enjoyable.

Mr. Phillips recommends that inventors apply themselves towards producing a spring that will return the typewriter carriage to place after the bell has rung, at the same time moving the paper up for a new line.

He points out that this might be accomplished by an extra key which, when pressed down, would cock a spring of greater strength than that of the carriage return spring.

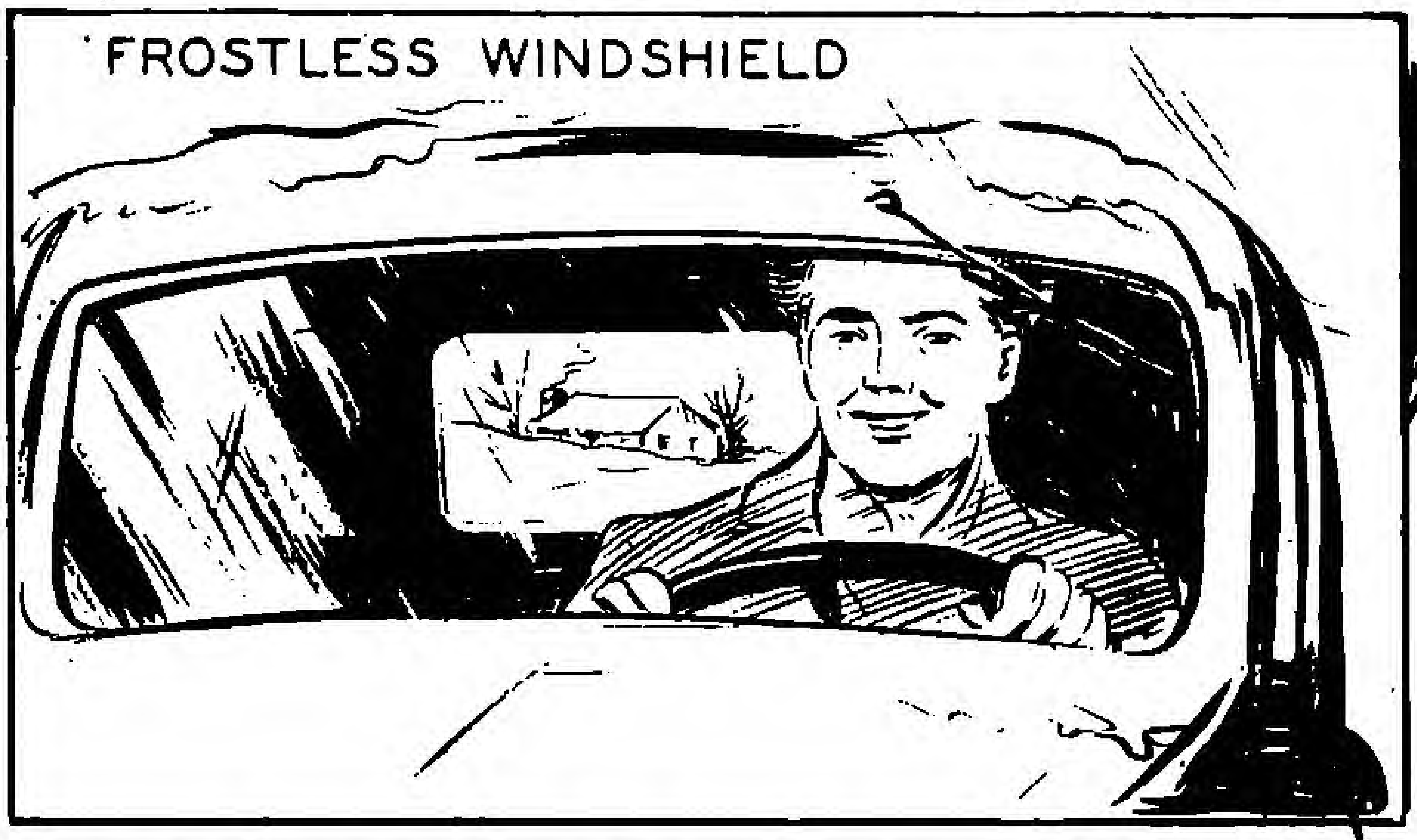
The second prize of $10 goes to M. W. Miller of Hortonville, Wis. It is his contention that there must be some way to make automobile windshields frostproof, an invention which all motorists will agree is much needed. Miller believes this could be done either through a clever electrical system or by the use of some transparent substance upon which frost or ice could not form.

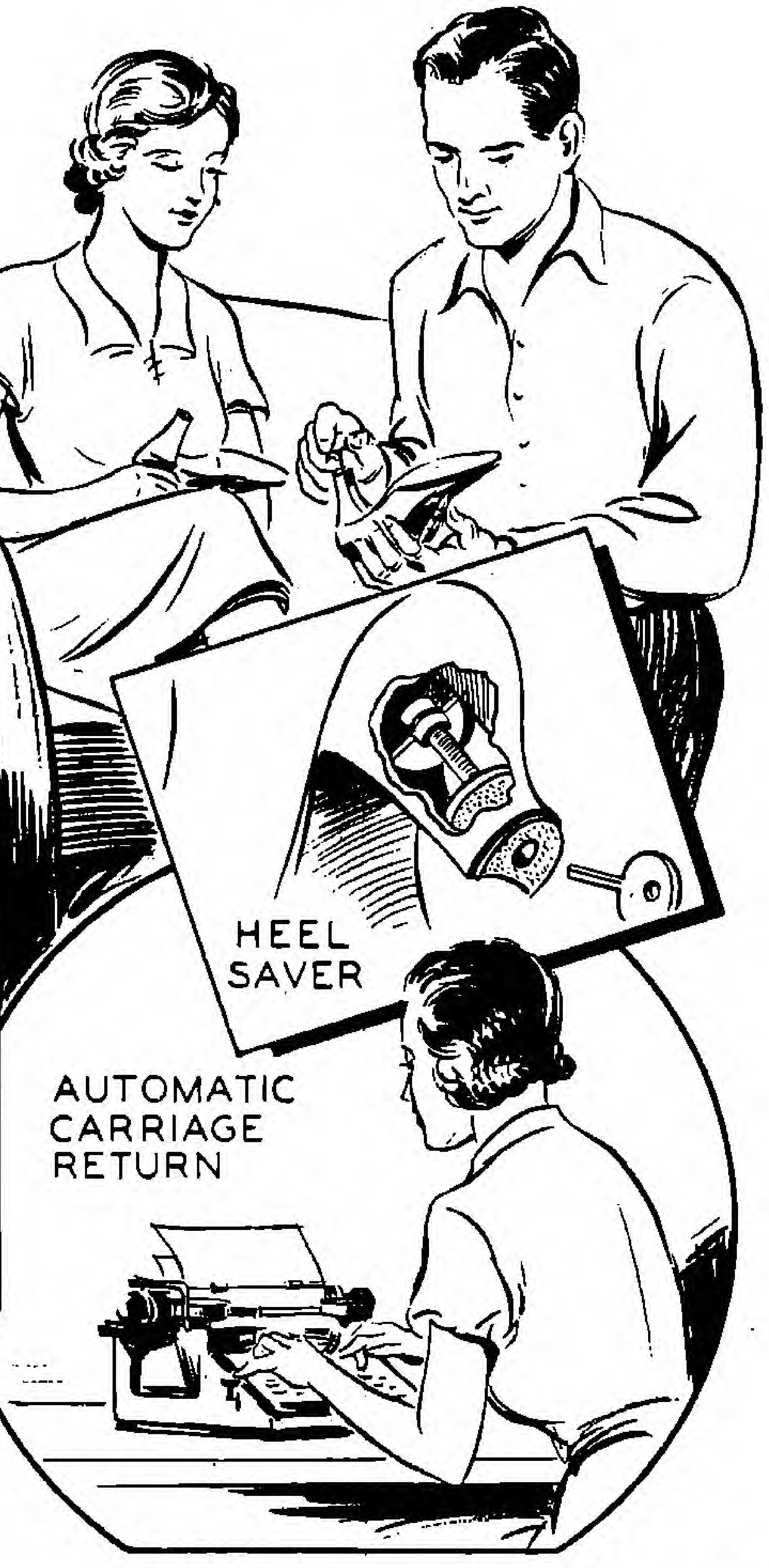
August F. Steeve of Chicago, Ill., sent in his third prize winning entry in the form of a drawing. He claims that the solution for an everlasting

[*Continued on page* 128]

PRIZES

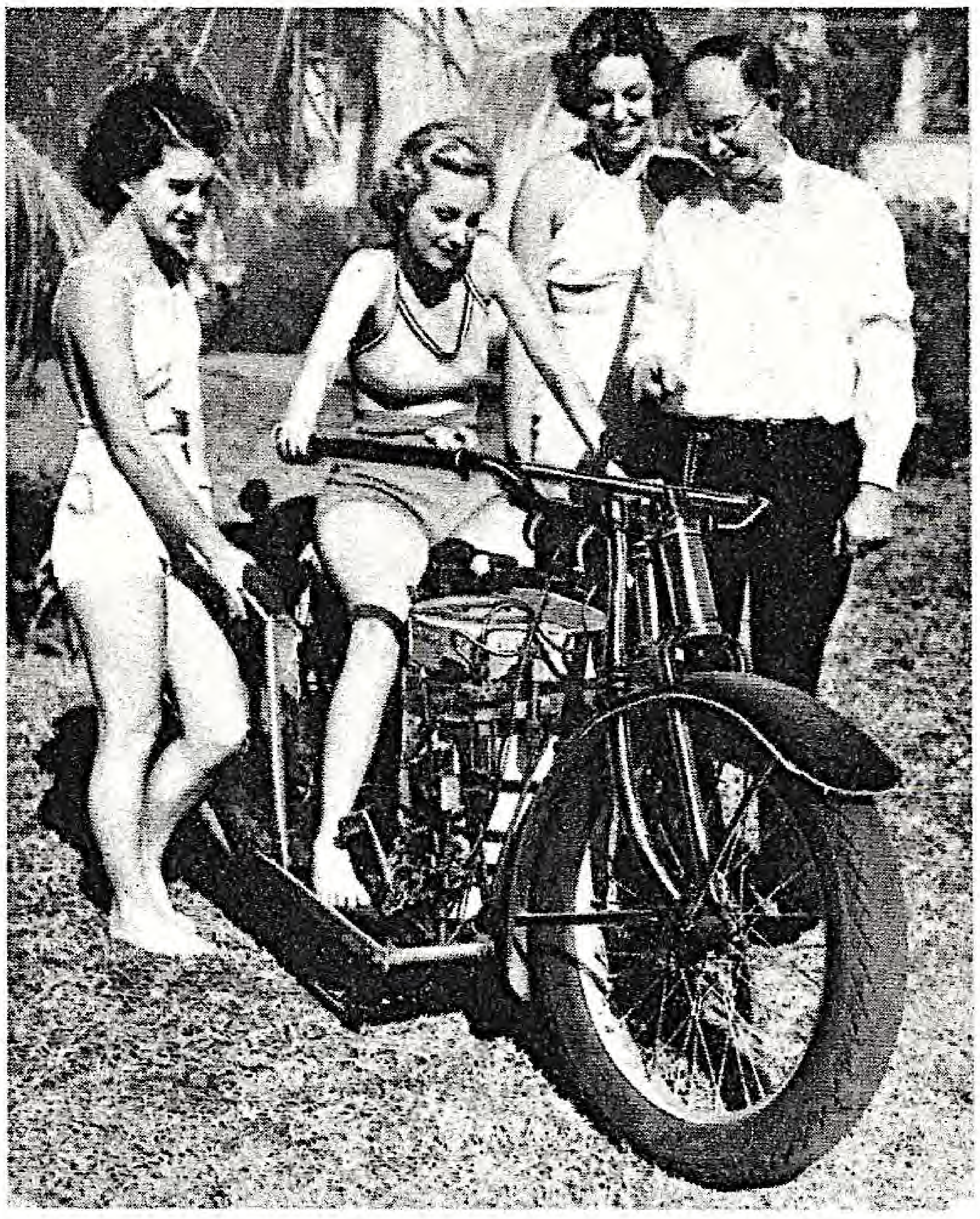
First Prize	$25.00 in Cash
Second Prize	10.00 in Cash
Third Prize	5.00 in Cash
Three Fourth Prizes	2.00 each
Four Fifth Prizes	1.00 each
Total—10 Prizes	$50.00 in Cash





Above—Motorists all agree that frostless glass windshields are a much needed invention. Perhaps this could be accomplished with electricity, or possibly an ice-resistant chemical substance would do the trick. Right, above—This woman's heel saver could consist of a metal shell out of which could be screwed a fresh rubber heel. Right—A key that will return typewriter carriage after a line is much needed in business.

Steam Motorcycle Cruises 50 Miles On Gallon of Fuel Oil



This steam driven motorcycle can average 50 miles to a gallon of fuel oil. It operates on 250 pounds of steam pressure and can run either forwards or backwards. It has no gear shift.

FIFTY miles to a gallon of fuel oil is claimed for a steam driven motor invented by A. C. Pierce, of Miami, Fla. The machine is noiseless and has no gear shifts.

The machine is electrically welded to withstand a steam pressure of 500 pounds and a hydraulic pressure of 800 pounds. It is powered with a two-cylinder double action steam engine with a 2½ inch box and a 3½ inch stroke. As the normal operation requires but 250 pounds of steam pressure there is a 100 per cent safety margin.

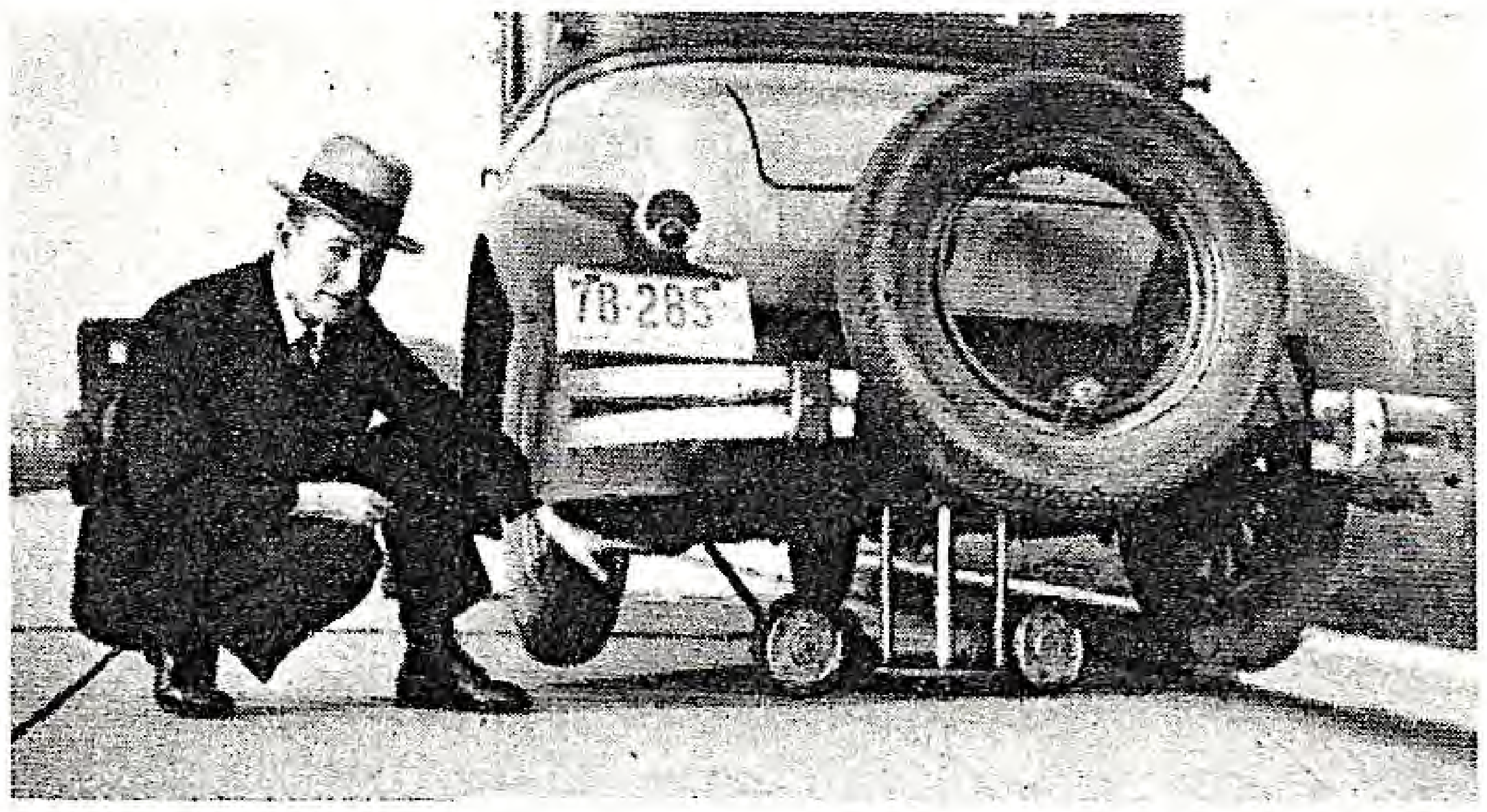
Water from the tank is pre-heated in a 20-foot copper coil before reaching the boiler, where it is heated to 400 degrees. From the boiler the steam passes through a superheater where it is brought to a temperature of 600 degrees before entering the engine.

The engine is controlled by a foot pedal and stops automatically when the pedal is released. A foot brake operates the rear wheel.

Lateral Drive Wheels Park Auto

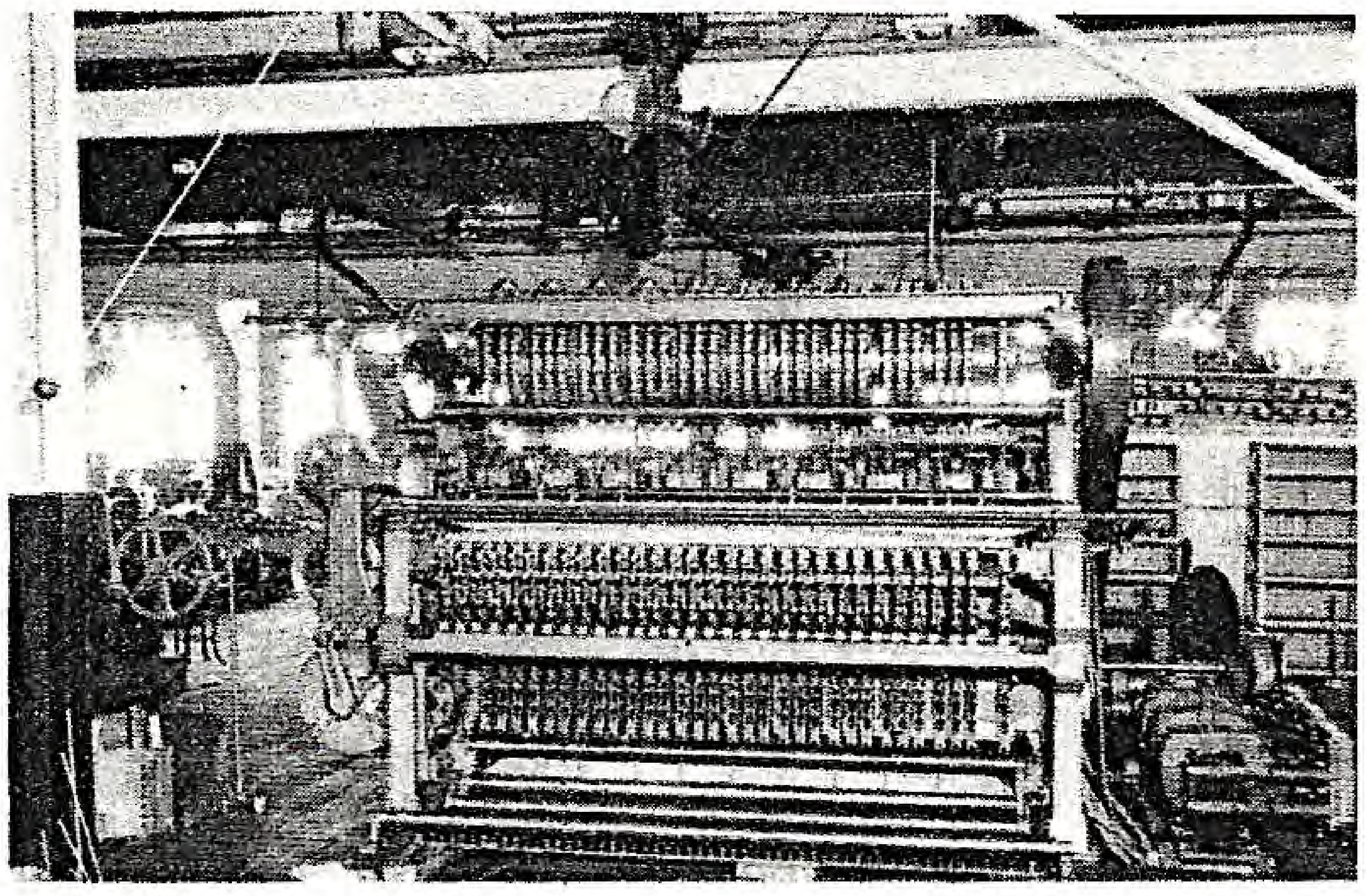
COMBINING the action of an automatic car jack with that of an auxiliary drive wheel, a Vancouver inventor has produced a new type of car parker which operates from the automobile motor.

When the car has been nosed in to the curb, a small gear shift lever is pulled, which lifts the car on a wheeled jack. Another shift of the lever starts the wheels to the left or right until the lever is shifted into final position which lowers the car and releases the gear automatically. The whole process takes less than a minute.



This unique car parker operates from the automobile motor. An auxiliary gear shift raises the car on the jack, swings it left or right, and lowers it into position by the curb.

Wire Fabrics Made On Loom



Weaving steel fences as easily as a loom weaves cloth, this giant of industry employs thirty-two individual electric welding units for joining the wire into the finished product.

EMPLOYING 32 individual welding units as needles and steel wire for cotton a mighty loom, recently completed by a New England electric manufacturer, is capable of producing up to 50 tons of wire fabric daily.

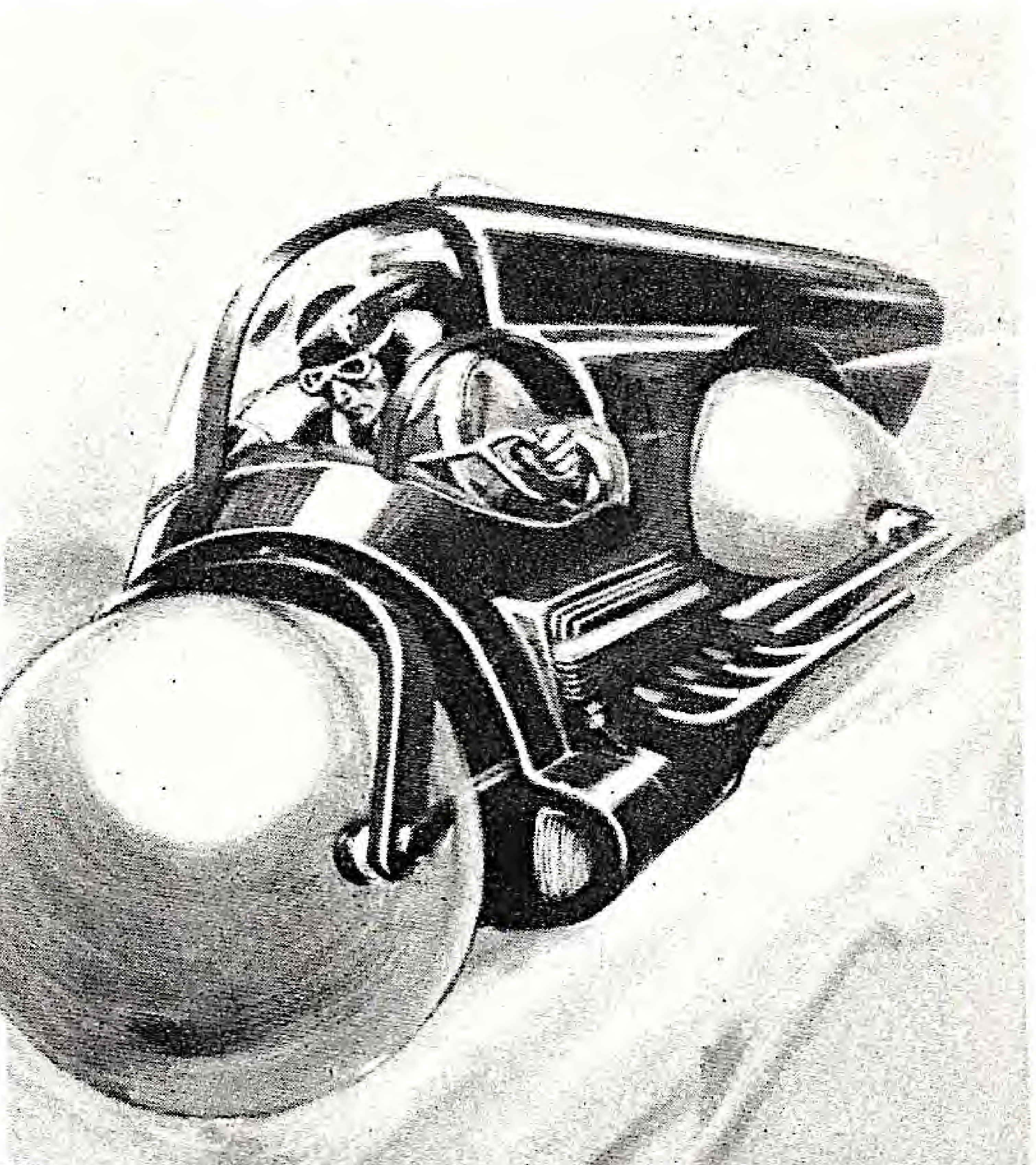
The machine, which will be used in the manufacture of steel fences and concrete reinforcing mesh, is fully automatic and needs little attention after being placed into operation. Its welding electrodes may be adjusted so as to produce the desired pattern no matter how intricate the design. Wire fabrics up to 12 feet in width may be woven on the machine in just a fraction of the time required by former methods. The welded units have proved exceptionally strong.

Super-Cycle to Smash All Speed Records

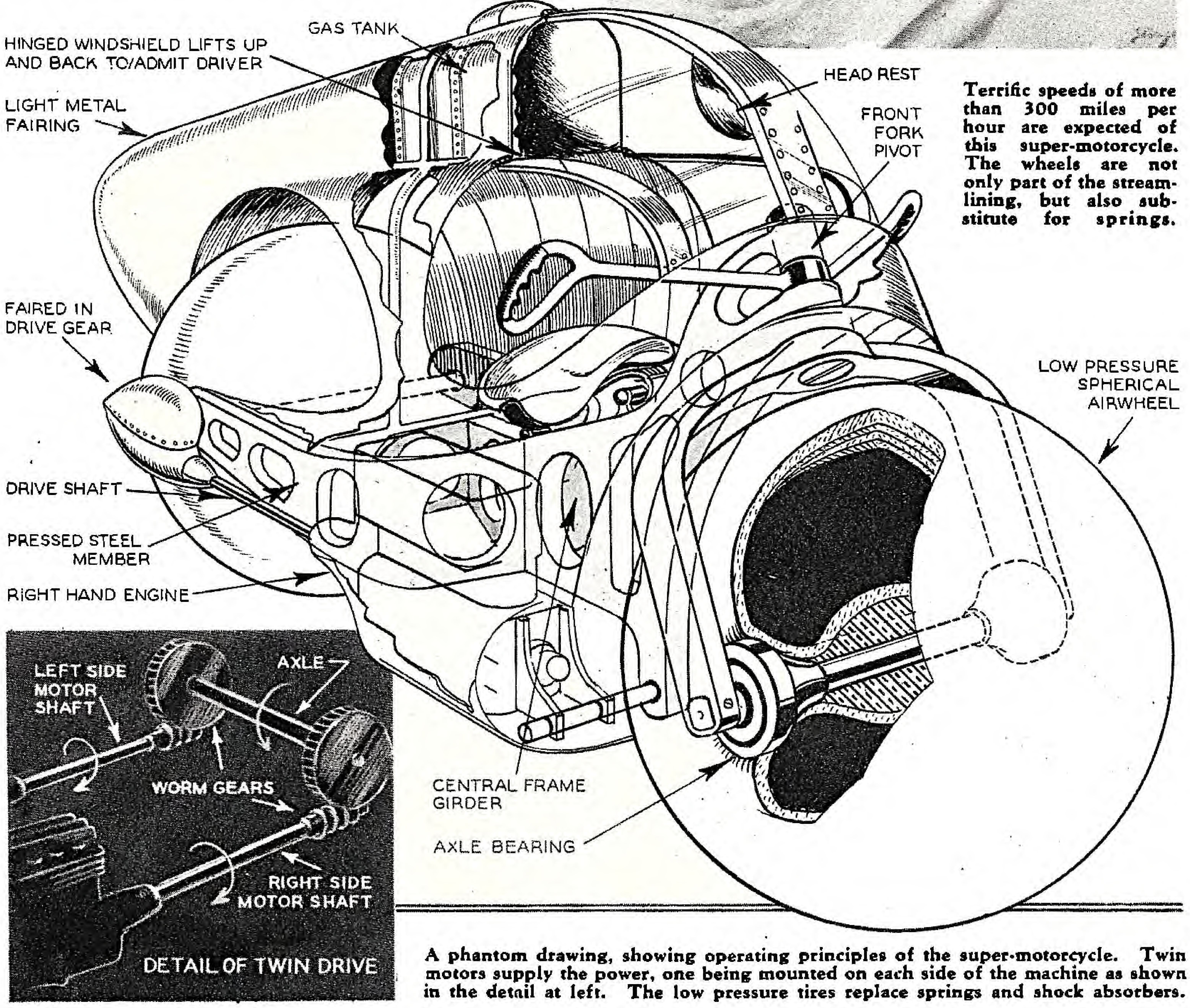
MOUNTED on spherical airwheels of moderate pressure, a recently designed super-motorcycle powered with twin motors is expected to shatter all existing speed marks for land vehicles. Speeds of more than 300 miles per hour will be reached without difficulty, its designer believes.

The driver is encased in a partially faired-in cabin and is securely strapped down in his seat. A headrest over the windshield provides additional bracing. Steering is effected in the customary manner. Two separate power plants are employed, one on each side of the powerful rigid chassis. The drive is carried to the rear globular wheel by means of conventional shafts and gearing.

The peculiar wheels, apart from providing greater traction and serving as shock-absorbers, are expected to add to the streamline possibilities and the stability of the machine.



Terrific speeds of more than 300 miles per hour are expected of this super-motorcycle. The wheels are not only part of the streamlining, but also substitute for springs.


GAS TANK
HINGED WINDSHIELD LIFTS UP AND BACK TO ADMIT DRIVER
LIGHT METAL FAIRING
HEAD REST
FRONT FORK PIVOT
FAIRED IN DRIVE GEAR
LOW PRESSURE SPHERICAL AIRWHEEL
DRIVE SHAFT
PRESSED STEEL MEMBER
RIGHT HAND ENGINE
CENTRAL FRAME GIRDER
AXLE BEARING
LEFT SIDE MOTOR SHAFT
AXLE
WORM GEARS
RIGHT SIDE MOTOR SHAFT
DETAIL OF TWIN DRIVE

A phantom drawing, showing operating principles of the super-motorcycle. Twin motors supply the power, one being mounted on each side of the machine as shown in the detail at left. The low pressure tires replace springs and shock absorbers.

Besting Mother Nature With

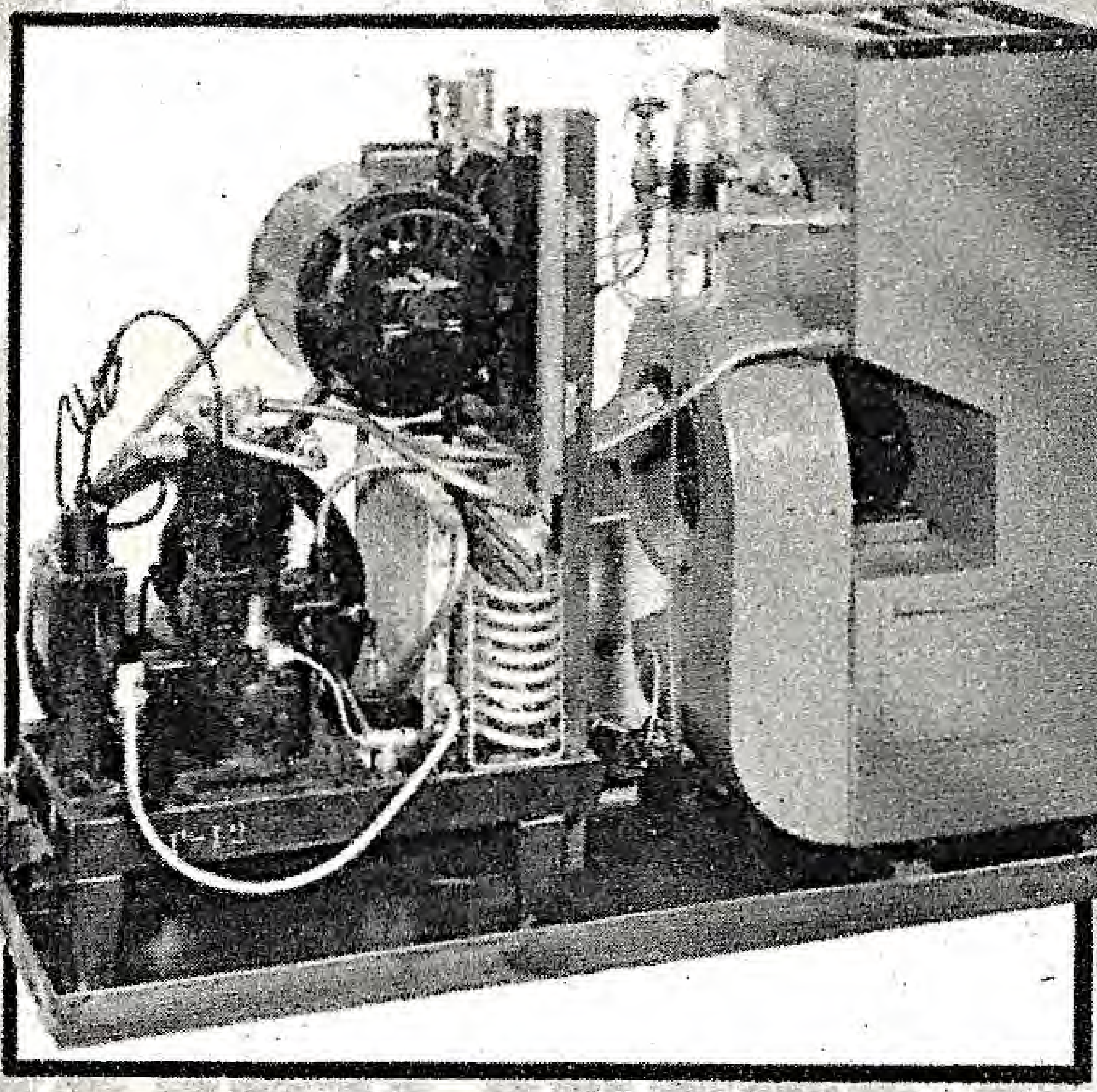
by ALFRED ALBELLI

AIR conditioning, if the definition is necessary, is anything that is done to the air we live in to relieve the body of exertion—to lessen the strain of living. And the human body is a marvelously automatic machine.

In winter, the body exerts itself to provide warmth. In the heat of summer, just the opposite occurs—with the body always striving to maintain a normal temperature of 98.6 degrees. A refrigerating plant then, as well as a heating plant—cooling itself by evaporating perspiration. And with summer and the "dog days" nearly here, the body comfort derived from man-made air conditioning is easily apparent.

The Sahara-like indoor air of our homes is undoubtedly the greatest single reason for the high winter rate of illness and death. Sufficient moisture in the indoor air—humidification—is of prime importance next to an outside air supply for bodily health.

The costs of the machinery and installation depend on your personal needs and the size of your house. Single port-



Air conditioning apparatus comes in all shapes and sizes. The portable unit (above), with shell removed, shows the motor, blower and refrigerating units compactly assembled.

The air conditioner above demands a water connection, for it is operated with hot and cold water at a pressure corresponding to that of the local water main. Despite the hot day, this bungalow is cool, for the volume of air being delivered is sufficient to condition 800 square feet of space, more than enough for this home.

Home Air Conditioning

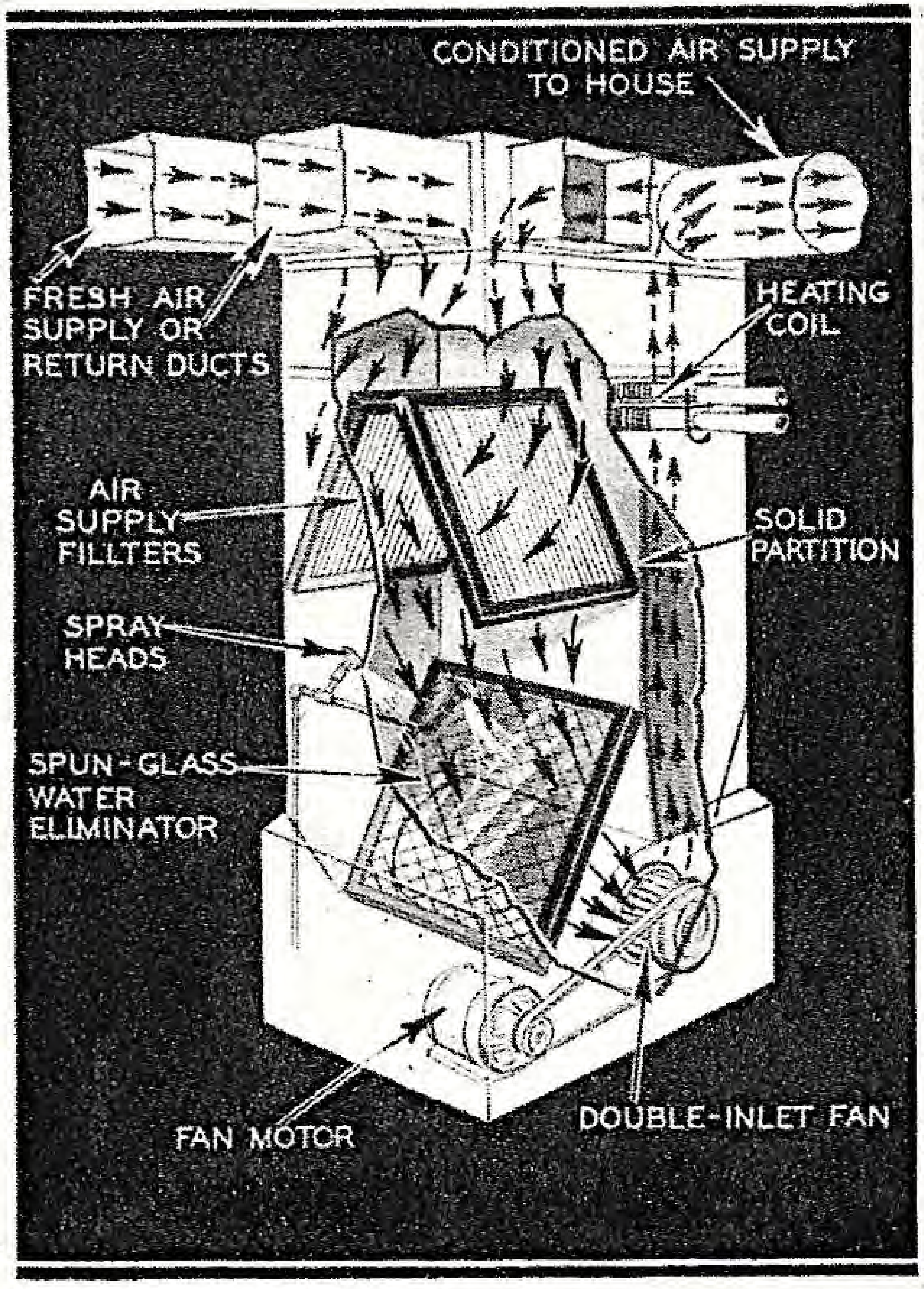
able units start as low as fifty dollars. Initial costs of systems containing all winter air conditioning features are between five hundred and one thousand dollars—again depending on the size and structure of your house. Complete all year round systems range from seventeen hundred to two thousand dollars. There are, of course, more expensive and more complicated systems. The prices quoted are for the simplest systems for the average home of from six to ten rooms.

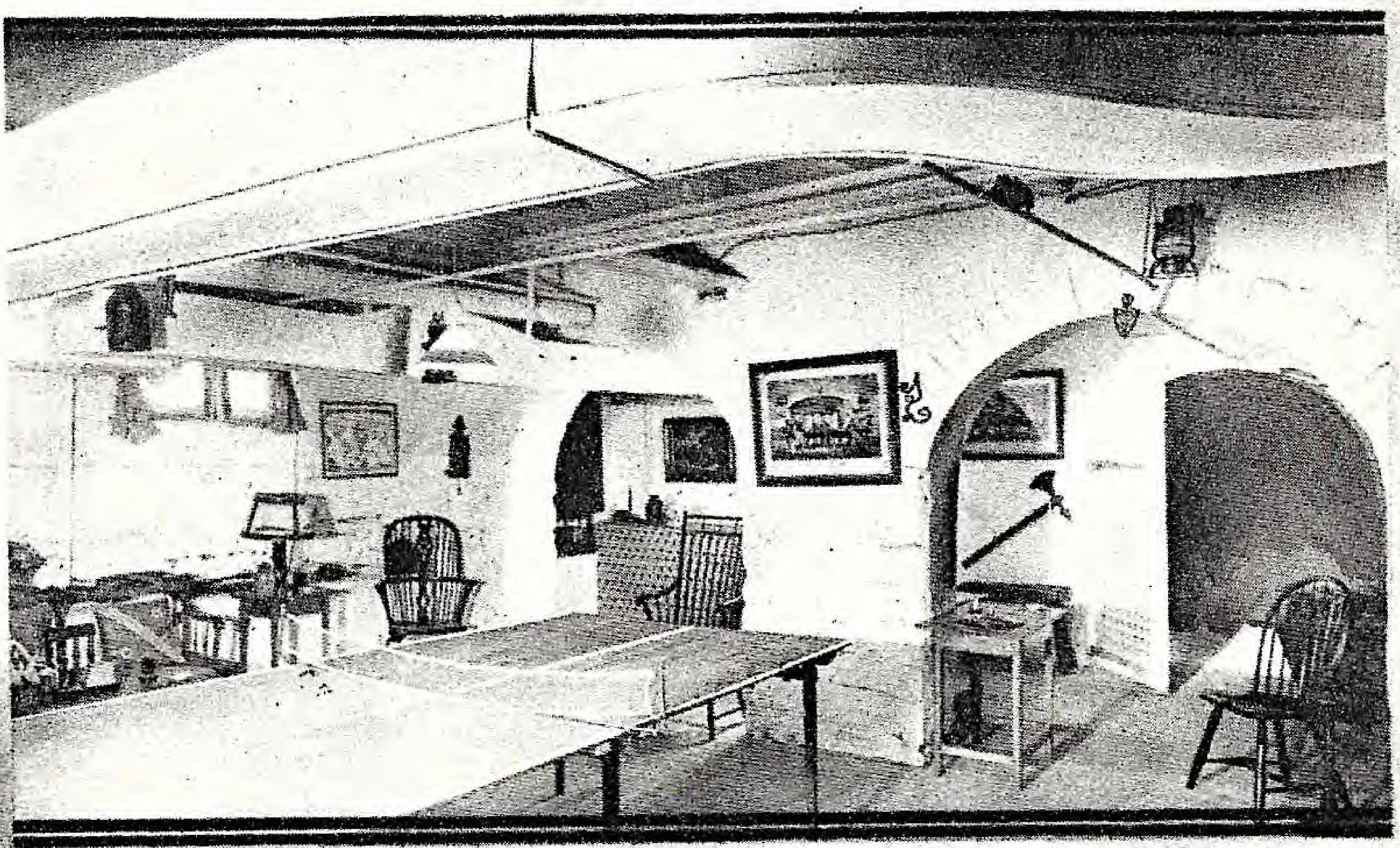
The operating costs of most winter systems will run about forty to fifty dollars per winter exclusive of heating. The year round systems run between three hundred and six hundred dollars a year to operate, due to the fact that refrigerating systems are much more expensive to install and operate. It must be borne in mind that different localities have different rates for the use of electricity. No prices can be set that would hold throughout the country.

However, it is important to bear in mind the features that do much to offset the expense of installation and upkeep. Namely, the

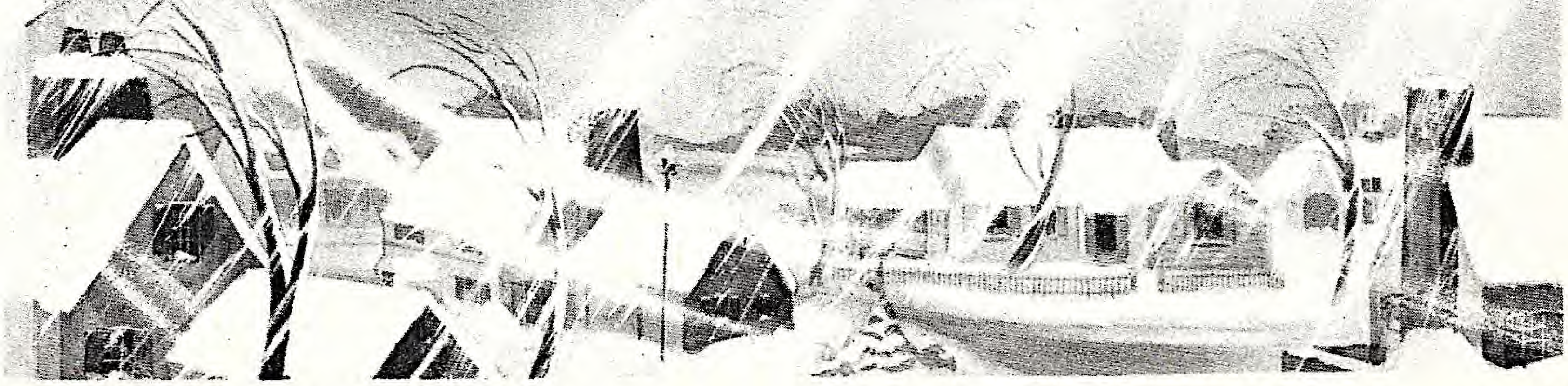
[*Continued on page* 120]

Reducing machinery and operation to its simplest form is much easier than adjusting personal comfort to an accepted average. The diagram illustrates its simplicity.

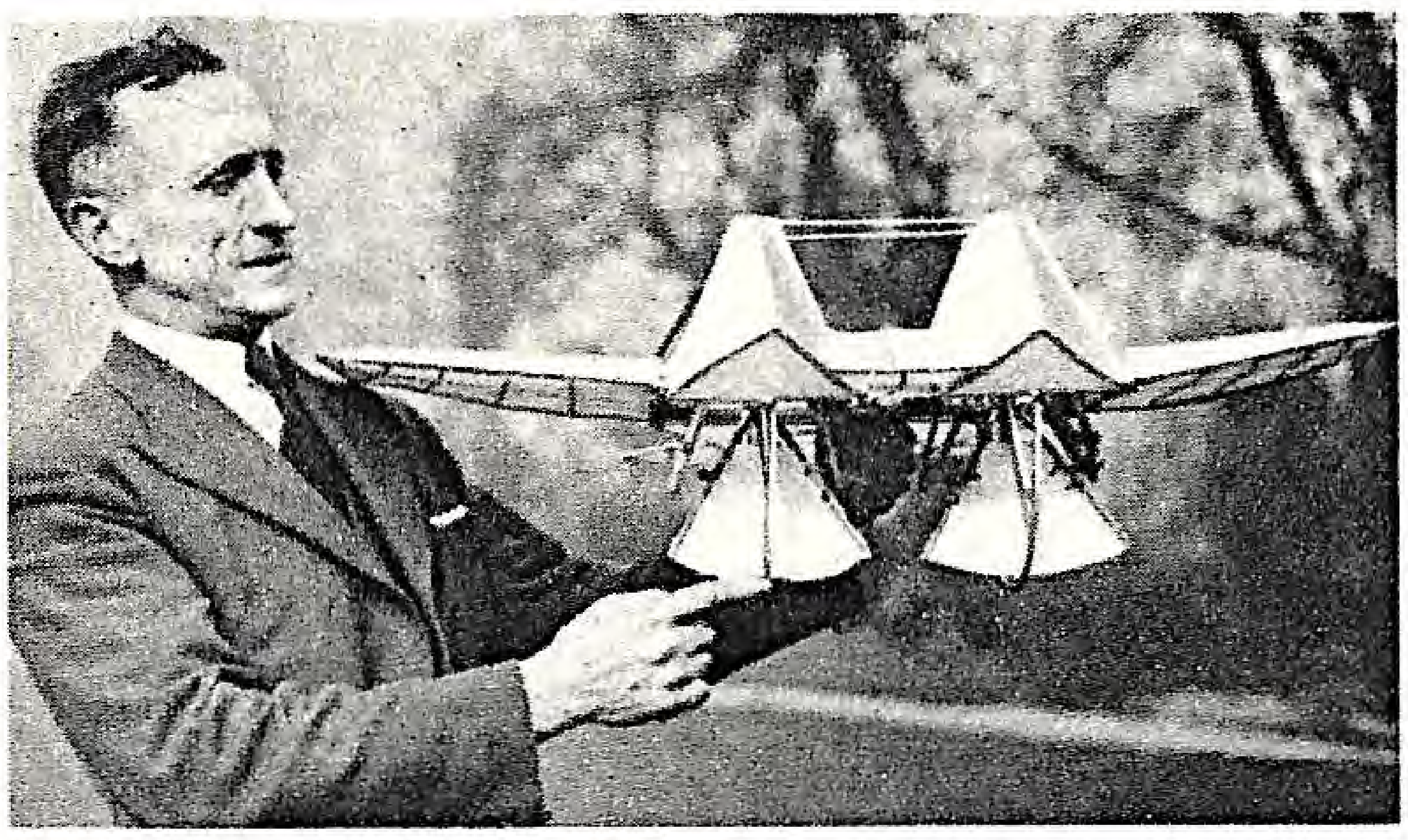

CONDITIONED AIR SUPPLY TO HOUSE
FRESH AIR SUPPLY OR RETURN DUCTS
HEATING COIL
AIR SUPPLY FILLTERS
SOLID PARTITION
SPRAY HEADS
SPUN-GLASS WATER ELIMINATOR
FAN MOTOR
DOUBLE-INLET FAN



Modern heating and cooling apparatus have added extra living rooms to the house by transforming the once damp cellar or basement into warm comfortable rooms which can be decorated like those upstairs. A complete year-'round air conditioning system, such as glimpsed at the top of the illustration to the right, shows how a modern basement utilizes the air duct for warmth. There is ample head room.



Web-Footed Model Airplane Advances New Flight Theory



Here is the web-footed airplane which kicks its way through air like a duck through water. The vanes rotate on wheels, and open up on the down-stroke and close on the up-stroke.

EFFORTS to improve the airplane's method of propulsion, have lead to the invention by Robert Wood of Highgate, England, of a model plane which uses winged wheels instead of a propeller.

The model, the result of two years of constant experimentation, actually kicks its way through the air. Mounted between the spokes of two wheels are fabric vanes which open wide as they are brought around for the down-stroke, and close on the up-stroke. Each revolution of the wheels carries the plane both forward and up.

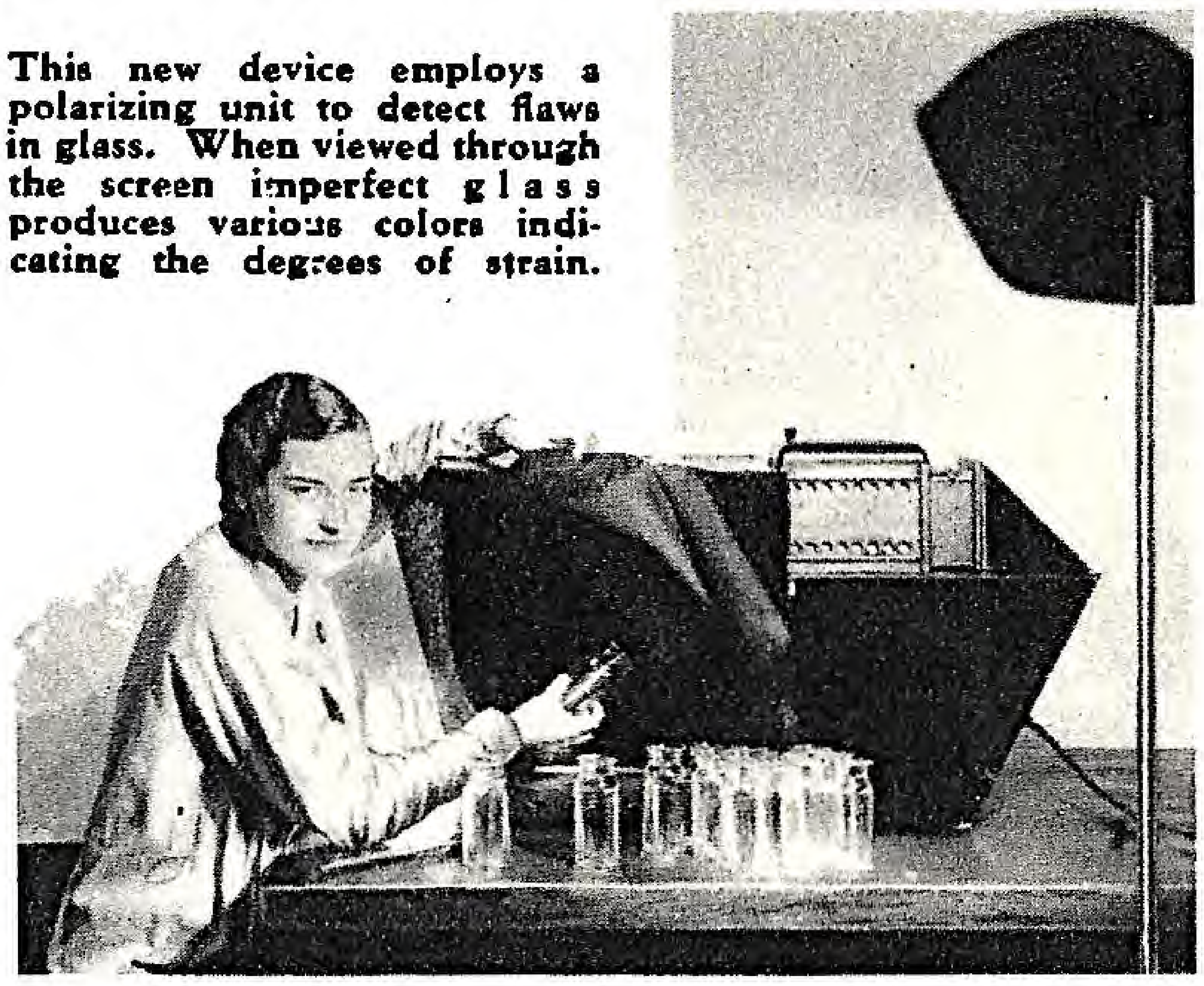
In event of motor failure, vanes can be folded tightly together and will not interfere with gliding ability of plane. Wood declares craft will prove cheap to build and operate.

Magnifying Glass Aids Dentists

AIDED by an illuminated magnifying glass, dentists are now able to discover the minutest cavities in teeth without difficulty. Any slight discoloration of the tooth, indicating the presence of a flaw in the enamel, is immediately detectable under the glass. The glass has a bright lamp attached to its frame which illuminates the field of magnification. It can be adjusted to any position, simplifying the task of drilling out small cavities.

Tiny cavities become enormous holes to the dentist who uses this combination magnifying glass and spotlight. The light illuminates the tooth, and the glass magnifies it.

Polariscope Detects Flaws In Glass



This new device employs a polarizing unit to detect flaws in glass. When viewed through the screen imperfect glass produces various colors indicating the degrees of strain.

STRAINS in glass or any other transparent or semi-transparent object, are made visible by a new optical instrument consisting of a polarizing unit and an analyzing unit.

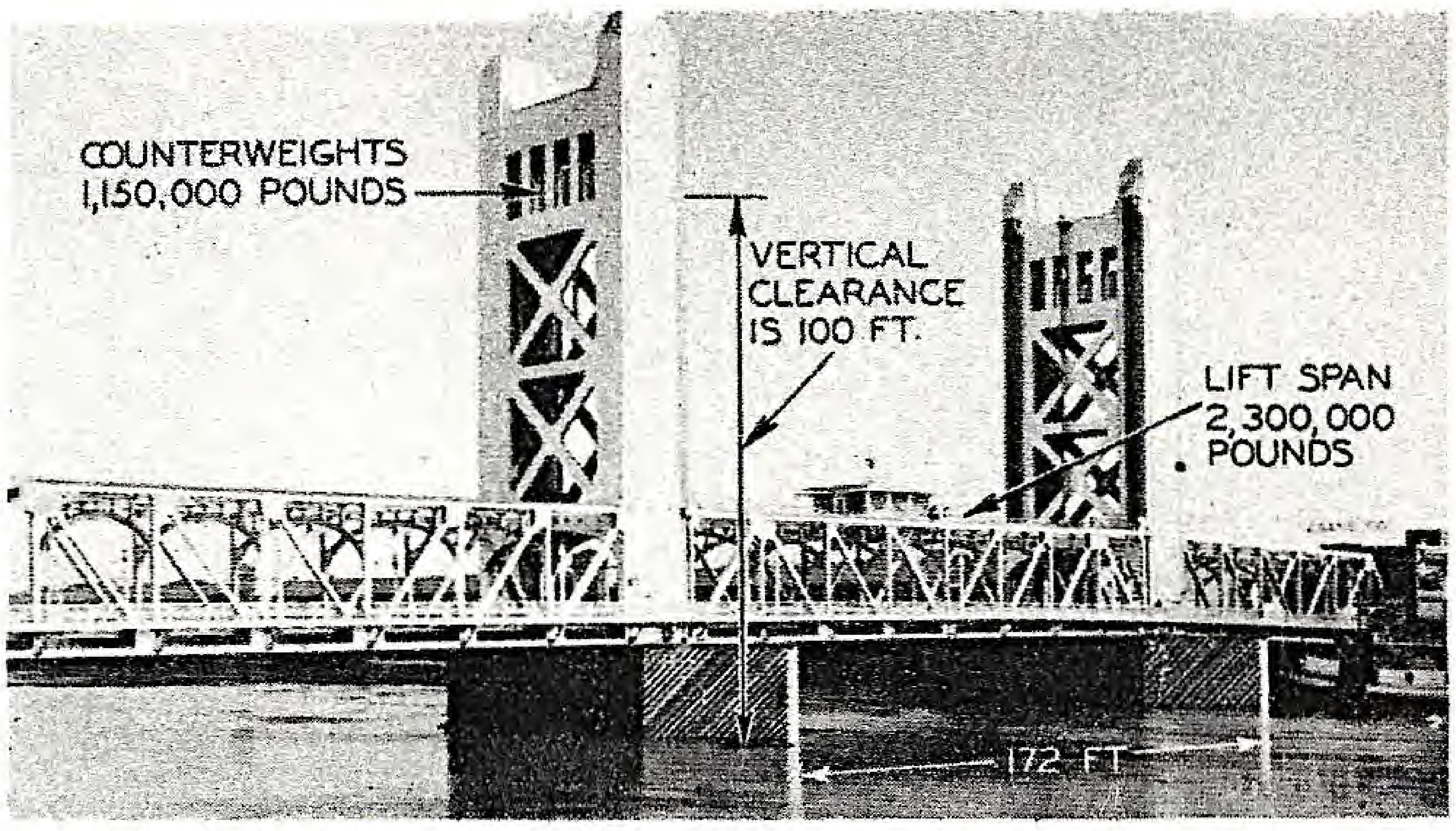
An even, parallel beam of light, guided by reflectors, is passed through the object being tested, the rays striking upon a concave polarizing plate of black glass. The rays are then picked up by the analyzing unit which consists of a calcite prism combined with a retardation plate. When the object being viewed is free from strain, the field of the instrument is a rich purple color. Any variation in this color indicates strain. If the strain is slight, it will show up as red or blue, while more severe tensions are revealed by green, orange or yellow rays. At present the machine is being used for testing glassware to minimize loss of materials.

New Sacramento Bridge Has Highest Vertical Lift Span

CLEARING Sacramento's river traffic at a height of 100 feet, is a new type of tower bridge 737 feet long, with a clearance of 172 feet between the fenders.

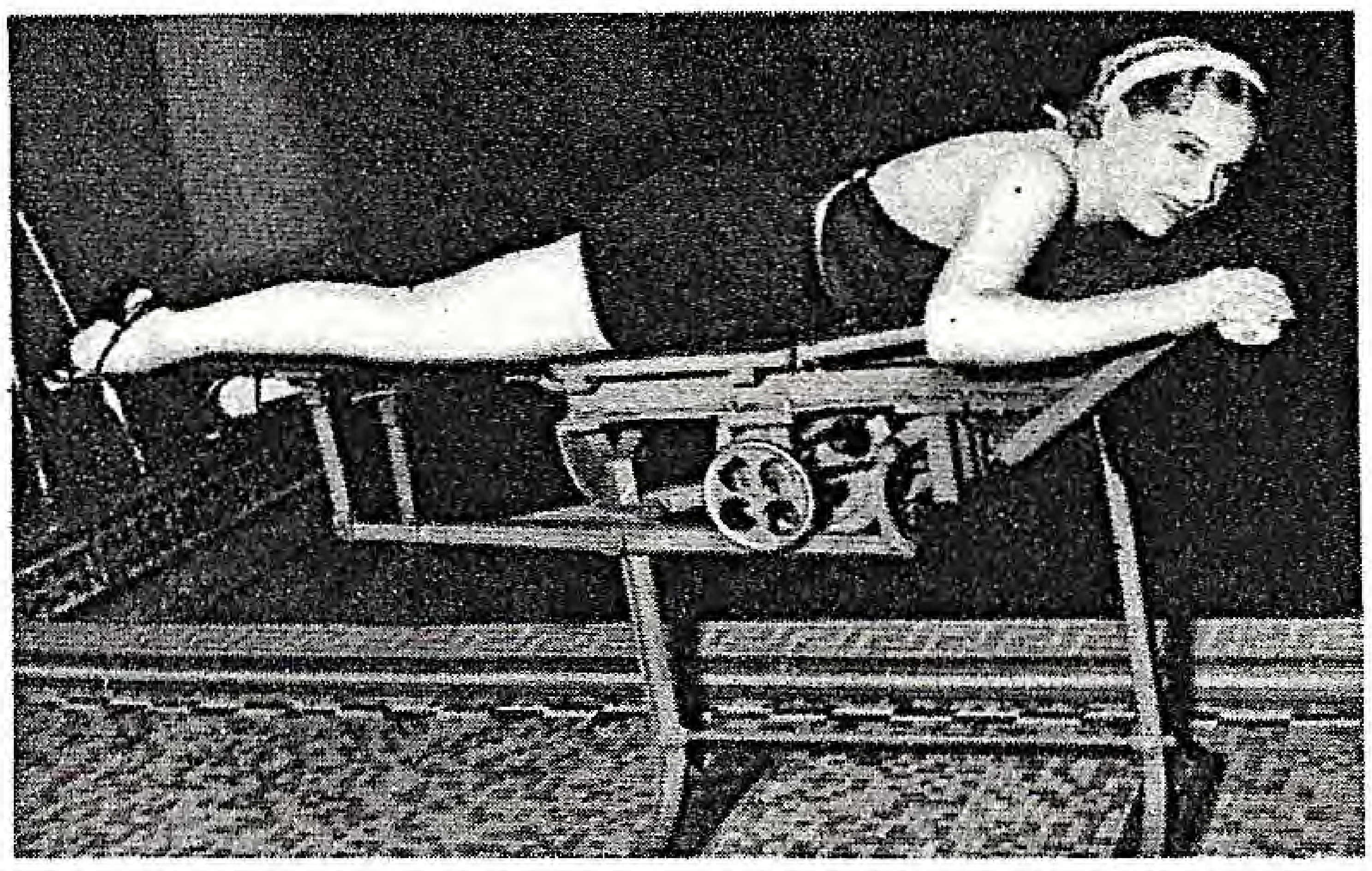
The load of the lift span is about 2,300,000 pounds and the lift can be raised or lowered at the rate of one foot a second. However, to avoid the necessity of lifting this huge weight as a direct load on the intricate electrical machinery, it is counterweighted by concrete-filled steel frames.

There are eight gates on the bridge in addition to the automatic derailing switches on the railroad approaches, with colored lights, signals, sirens to warn motor, train or river craft when the bridge is about to open. There are two pedestrian walks, four traffic lanes, and a thirteen foot space for railroad tracks.


COUNTERWEIGHTS 1,150,000 POUNDS
VERTICAL CLEARANCE IS 100 FT.
LIFT SPAN 2,300,000 POUNDS
172 FT.

The new Tower Bridge across Sacramento River, in California, is the highest vertical lift span of any bridge in the world. It clears the river by 100 feet.

Swim Co-ordinator Really Teaches



Water-shy people can now learn to swim on dry land and later take to the water, for the new Swim Co-ordinator trains leg and arm movements exactly as in actual swimming.

WHEN learning to swim, so many people emulate a wet hen that they get nowhere at all. But with the new "Swim-Co-ordinator the novice is assured of learning the right way to swim from the very start.

You lay yourself on the apparatus, as Bernice Claire is doing in the illustration, and by turning the hand cranks your arms and legs move up and down in exact duplication of the American crawl. Thus, after one or two lessons in "dry land" swimming, even those who have never swam before can handle themselves capably in the water. The device is installed at the Hotel Sheldon Pool, Gotham.

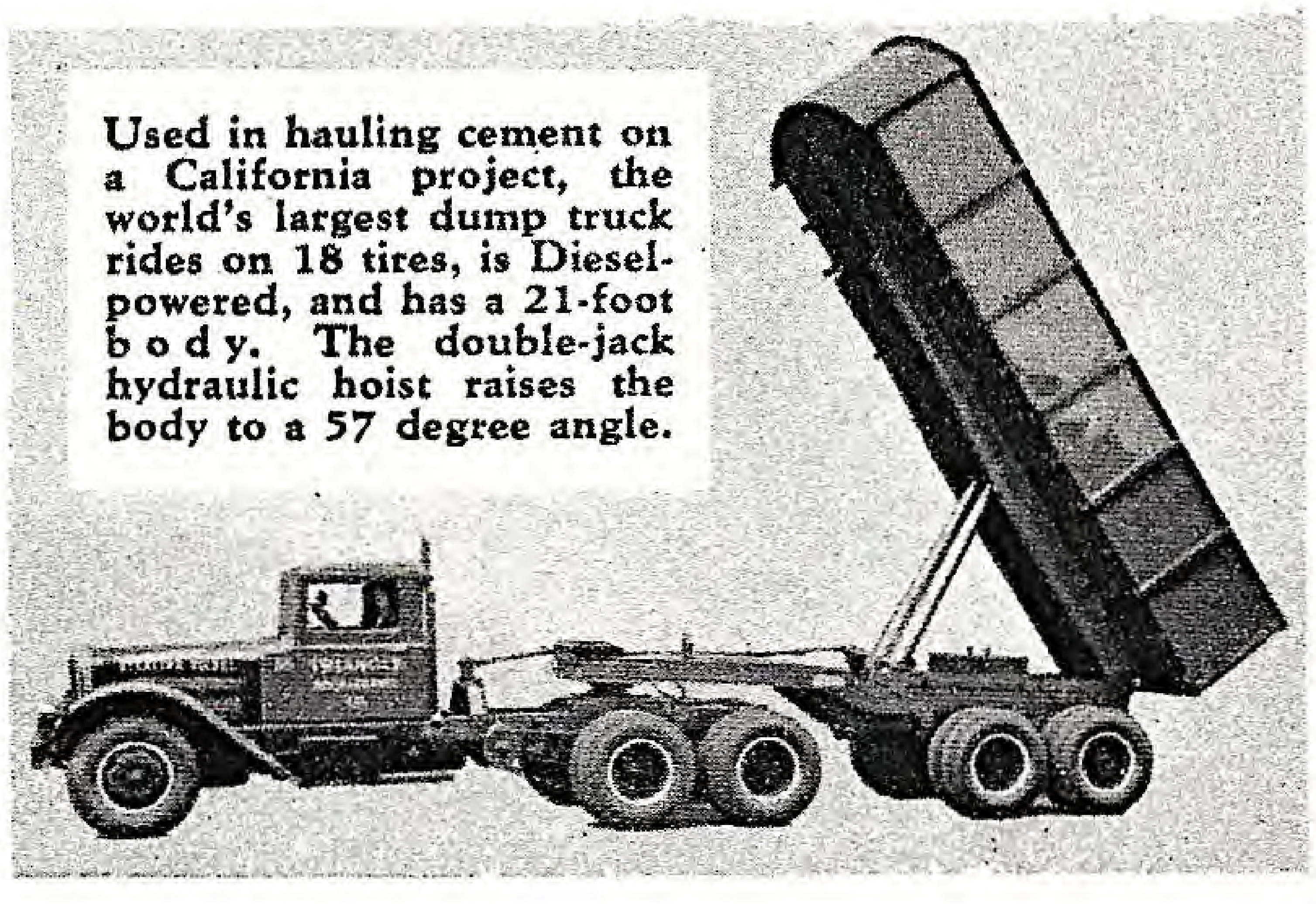
Largest Truck Is Diesel Powered

WITH California always exhibiting the largest something or other, now appears the largest dump truck in the world. The chassis carries a hoist body that is twenty-one feet long, with the job weighing 85,000 pounds empty.

Its Diesel engine is the product of a well known boat-engine manufacturer, and an idea of its low cost haulage can be figured against a cost of $.006 per truck load mile as against the present costs of gasoline equipment; a saving of about $400 a month.

A total of eighteen tires carried on ten wheels support the load, which travels as easily as an ordinary panel body light delivery truck. The driver rides in an upholstered cab.

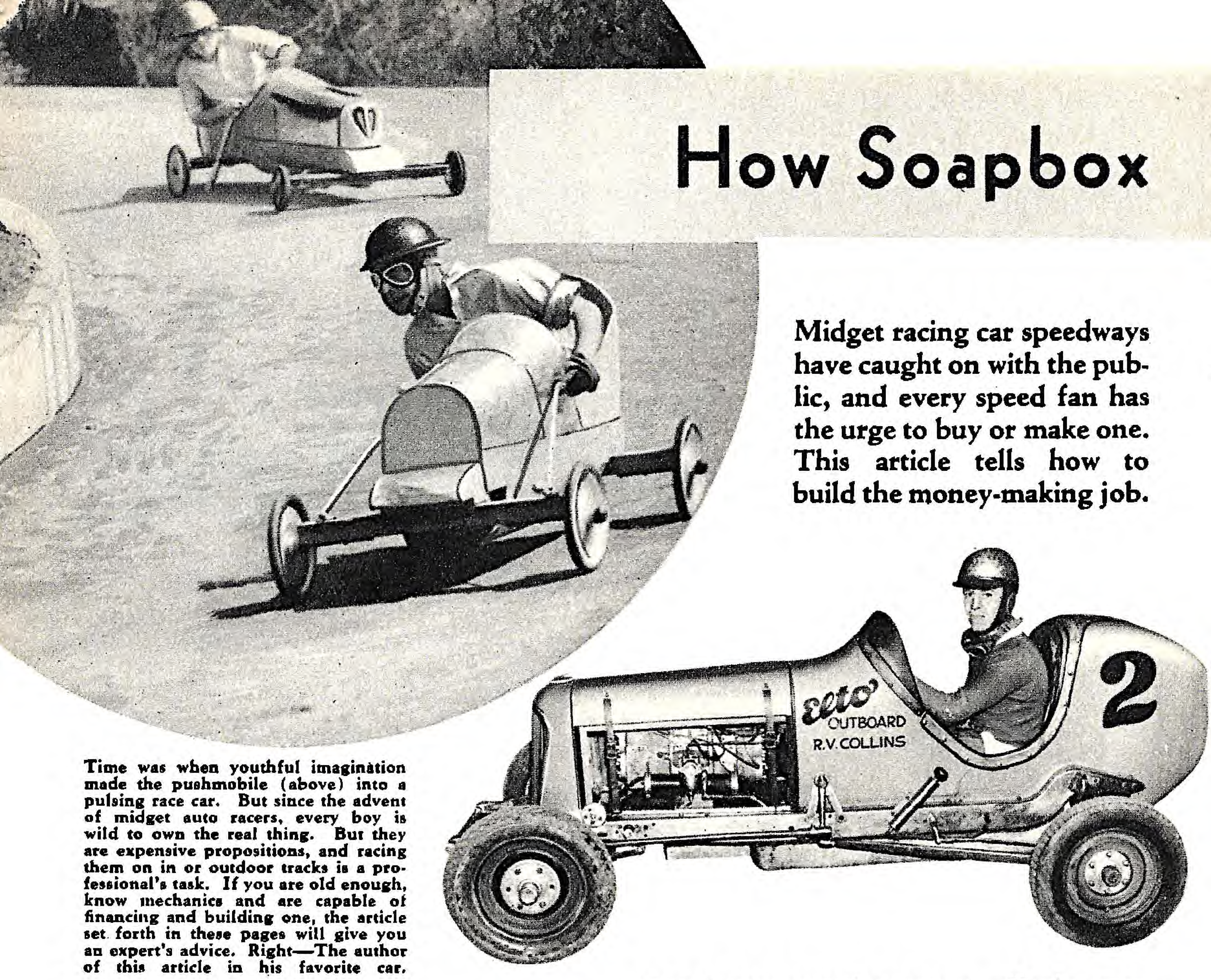
The double jack hydraulic hoist raises the body to a 57 degree angle. At this angle a truckload of fluid cement will flow like water. The truck, when fully loaded, is capable of carrying a load of 30 tons.



Used in hauling cement on a California project, the world's largest dump truck rides on 18 tires, is Diesel-powered, and has a 21-foot body. The double-jack hydraulic hoist raises the body to a 57 degree angle.

How Soapbox

Midget racing car speedways have caught on with the public, and every speed fan has the urge to buy or make one. This article tells how to build the money-making job.



Time was when youthful imagination made the pushmobile (above) into a pulsing race car. But since the advent of midget auto racers, every boy is wild to own the real thing. But they are expensive propositions, and racing them on in or outdoor tracks is a professional's task. If you are old enough, know mechanics and are capable of financing and building one, the article set forth in these pages will give you an expert's advice. Right—The author of this article in his favorite car.

NOT so many years ago I, too, was building and racing pushmobiles. And the steeper the hill, the faster I went. But somehow this didn't satisfy my craving for speed, for I lived near a great wooden bowl where real race champions rode to hot-tire fame. I wanted a machine powered with a gasoline motor, not imagination. But when midget racing came along . . . well, you will have to take my seat to understand the thrill I get out of it.

Now for the last lap!

You're out ahead of the hurtling pack, with two crack pilots behind fast closing up your lead. Your motor is shrieking its war cry, all those multiple horses under the hood tearing at the leash, pulling you split-seconds closer to the finish line.

Watch that curve, now—watch it! A broadside drift up that dangerous bank, for you missed the track's "groove" again. And you fight gravity and the wheel to line your bus into the straightaway. Push that accelerator through the floorboards, for you're "going to town" with the roar of the crowd in your ears.

There! The checkered flag has slapped against your coasting mount. You've won again! There is no thrill in the world like it.

How can you build a midget auto racer? Well, I am asked that question on an average of a hundred times a day. My answer always is: It depends on how good a mechanic you are, and, more important, how you are equipped with funds.

On anything over and above the ⅕-mile race track, the Miller or Offenhauser 4-cylinder 100 cubic inch midget car is supreme. On the shorter tracks, the Elto 4/60 power head accelerates and decelerates much more rapidly, and you can throw them around better. Here is the way I built the successful models I use on the Coast for ⅕-mile competition:

The thread is 45 inches. The wheelbase of the Elto-Collins is 70 inches. The wheels are 20-4 tires. The frame is of 12 gauge body steel, broken to form a channel and hammered out.

The rear axle is either a Model "A" or a Model "T" differential housing, with Model T shaft axles and differential. These are shortened to the required tread width, and the

Graduates Build Midget Racers

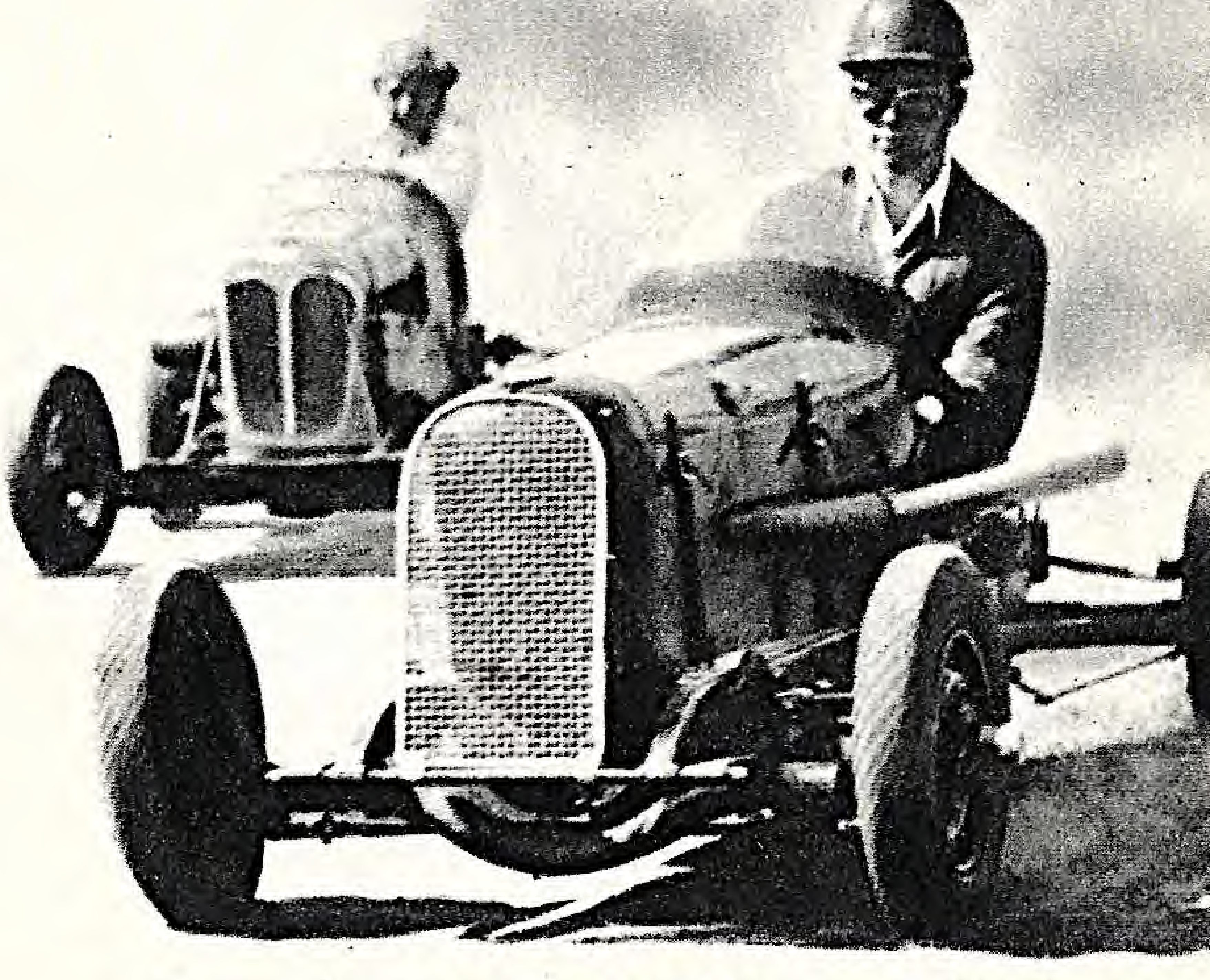
by

R. V. COLLINS

(Midget Car Builder & Designer)

brake drums, those constituting the internal expanding brakes of either a Model T or a Model A Ford are installed at the axle bearing ends with regulation bearings, etc. A radius rod and a spring clamp are fastened in to proper length as in usual Ford practice.

The spring in the rear is a shortened, lightened T spring. In front a leaf spring, semi-elliptical, is used on 18-inch lengths, about three leaves per spring. Usual Ford A front axle, re-cut and welded to tread width, with Ford drag links, etc., is used. Spring perches for the semi-elliptical front springs are welded to the axle.



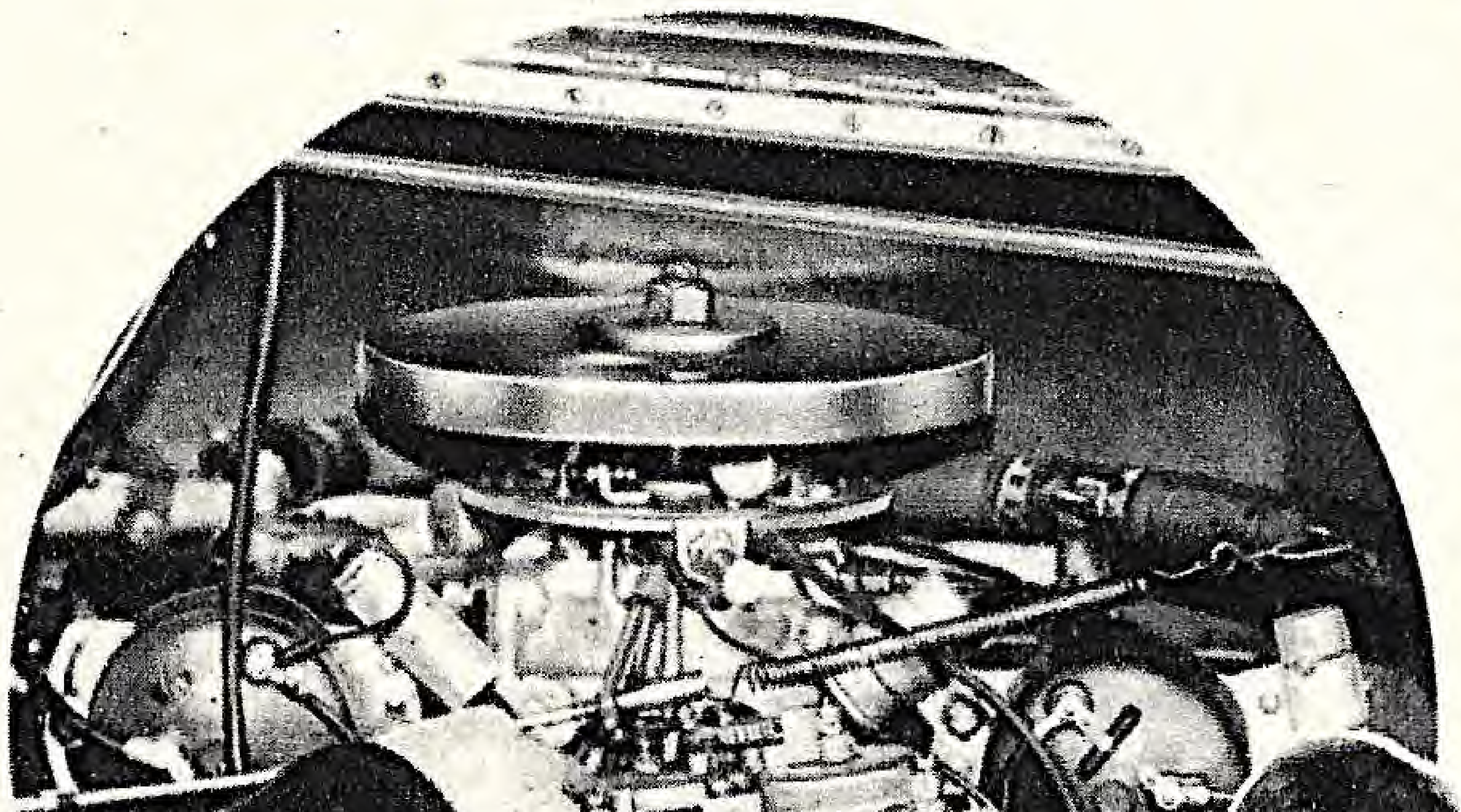
Every race track has an invisible "groove," which the pilots ride until forced out by competing cars. Then comes the thrill for the spectators—a hurtling car out of control.

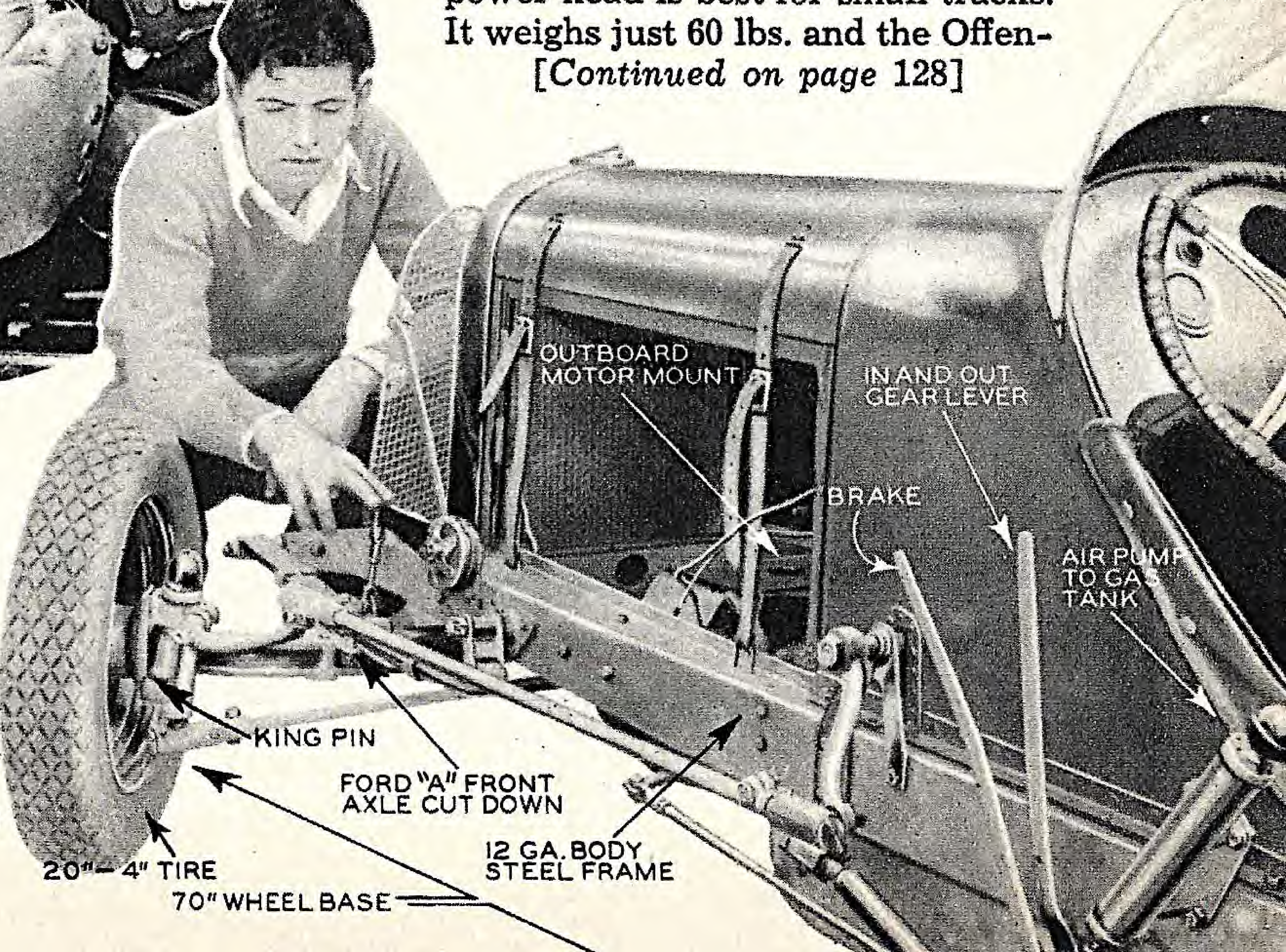
The photograph on page 85 shows how all these parts are disposed. The steering wheel is kept small in diameter and fits closely to the dash board.

The power head of the Elto is 60 cubic inches. Since weight must be kept down—everything in midget cars is pounds per horsepower—to give snappy pick-up and quick dying-out on the turns, this type of power head is best for small tracks.

It weighs just 60 lbs. and the Offen-

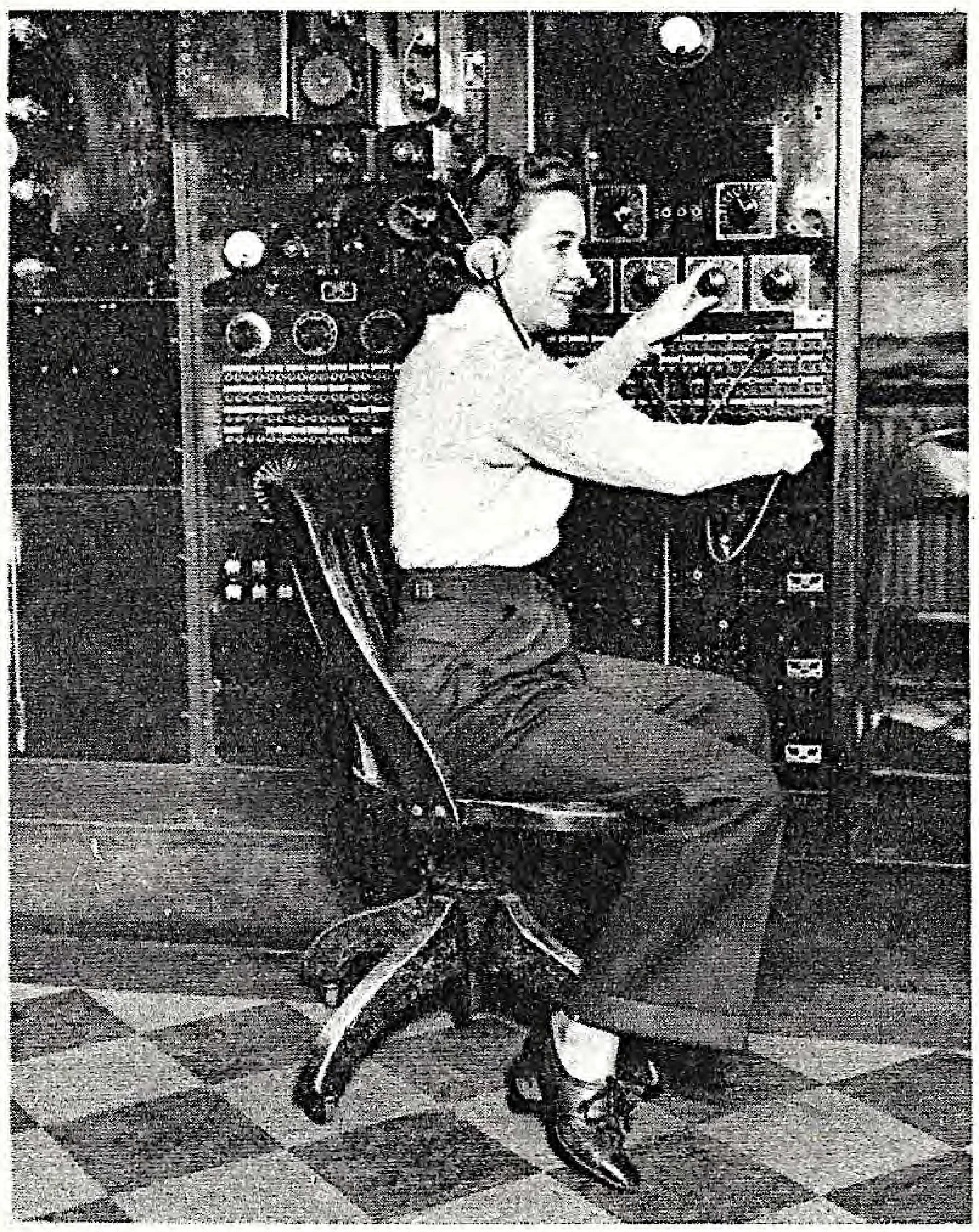
[*Continued on page 128*]





Above is shown the outboard power-head installation as it appears when the midget racer's hood is lifted. To the right (lower illustration) is the left front wheel turned outward to show the front axle assembly, with spring, drag links, etc. Note that the steering wheel is set very close to the dash and that the pressure pump is bolted outside body, so as to be easily accessible.

Kansas Girl Genius Operates Television-Radio Station



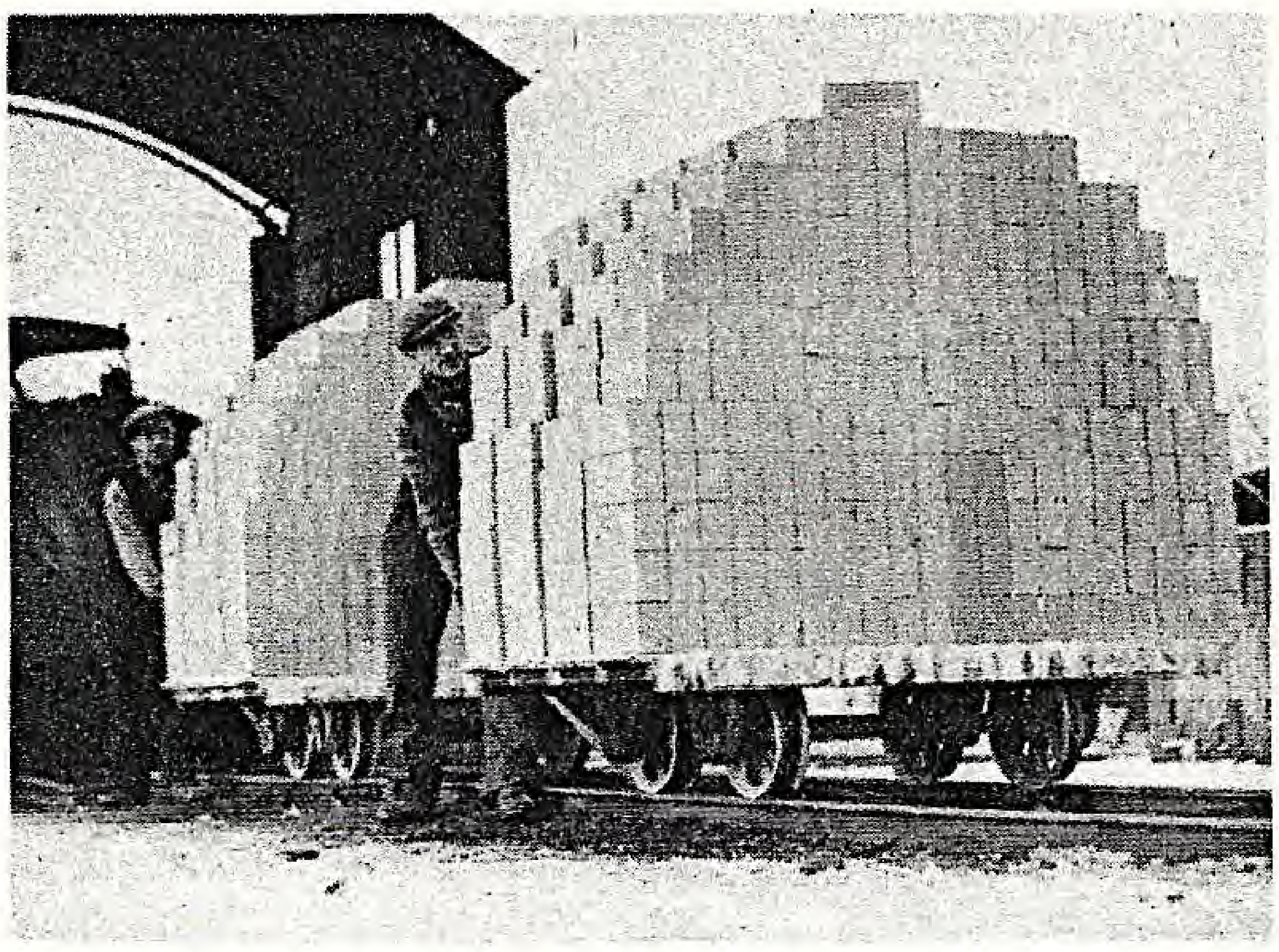
Youngest of women broadcasters, Miss Eleanor Thomas, 18-year-old Kansas City girl, is shown at the amplifier rack of Television station W9XBY where she is assistant engineer.

CONQUERING fields in which very few men have ventured eighteen-year-old Eleanor Thomas of Kansas City, Mo., is assistant engineer of Television station W9XBY. Finding the life on a college campus too prosaic Miss Thomas, a mathematical genius for a girl, decided to leave and enter an engineering school.

Throughout the course the young woman excelled in her studies and upon her graduation she was appointed to the position she now holds. She is the youngest member of her sex ever to pass the difficult examinations for a first class operator's license from the Federal Communications Commission.

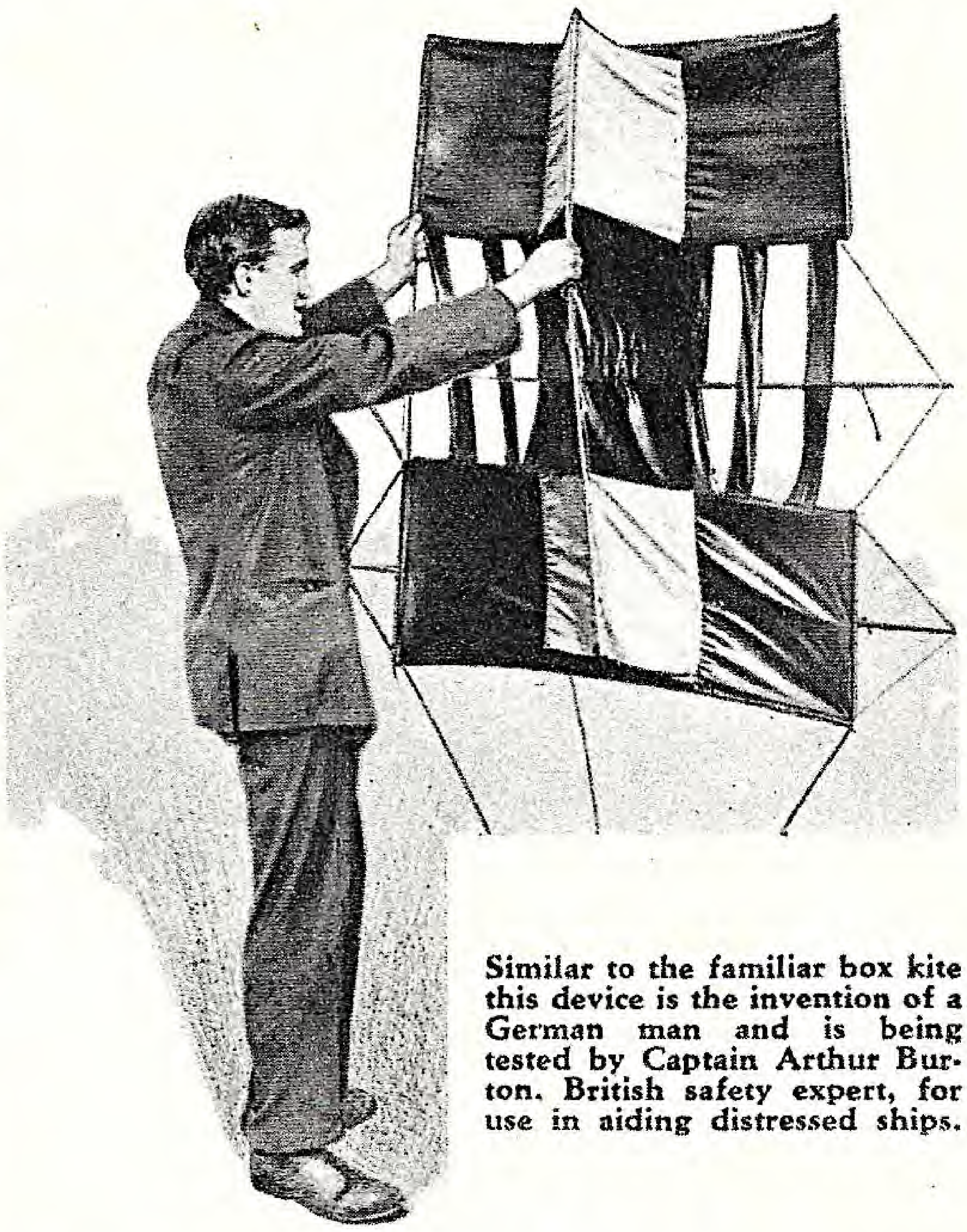
New Bricks Made of Shale Float

EMPLOYING waste shale material, a new brick industry has come into existence near West Lothian, Scotland. After years of research a group of building engineers discovered a method whereby bricks of any shape or color could be made from the material. The bricks are so light that they float and can be cut with a saw as easily as wood. The new brick is as strong as the usual types.



These Scottish workmen are removing from the kiln the first batch of floating bricks ever to be manufactured. The new building material is made from spent shale, a waste product.

Box Kite To Aid Distressed Ships

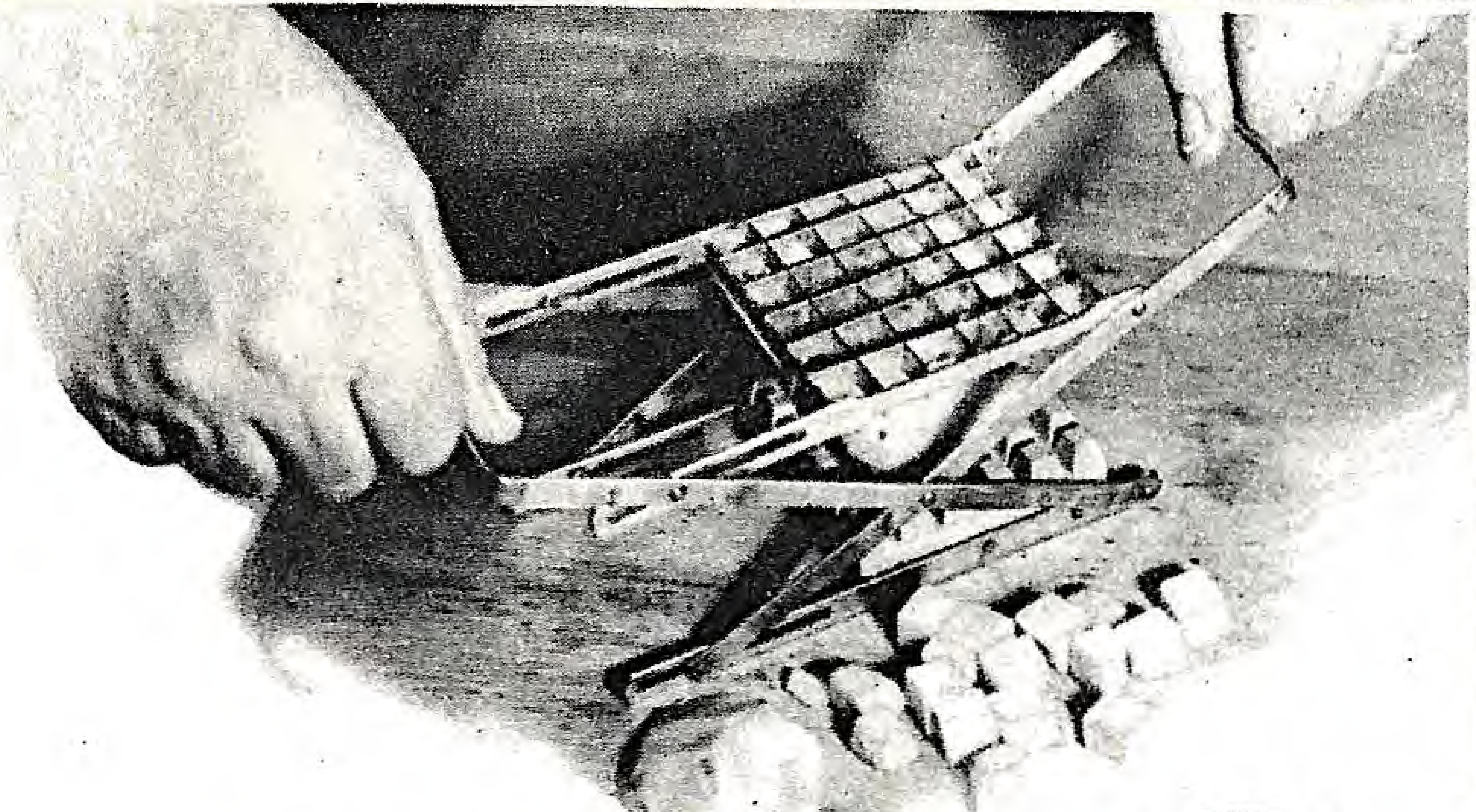


Similar to the familiar box kite this device is the invention of a German man and is being tested by Captain Arthur Burton, British safety expert, for use in aiding distressed ships.

A KITE that is believed to prove an important safety measure for ships in distress has recently been tested by a British expert on safety devices, Captain Arthur Burton. The odd kite is the invention of a German and is said to have unusual lifting power.

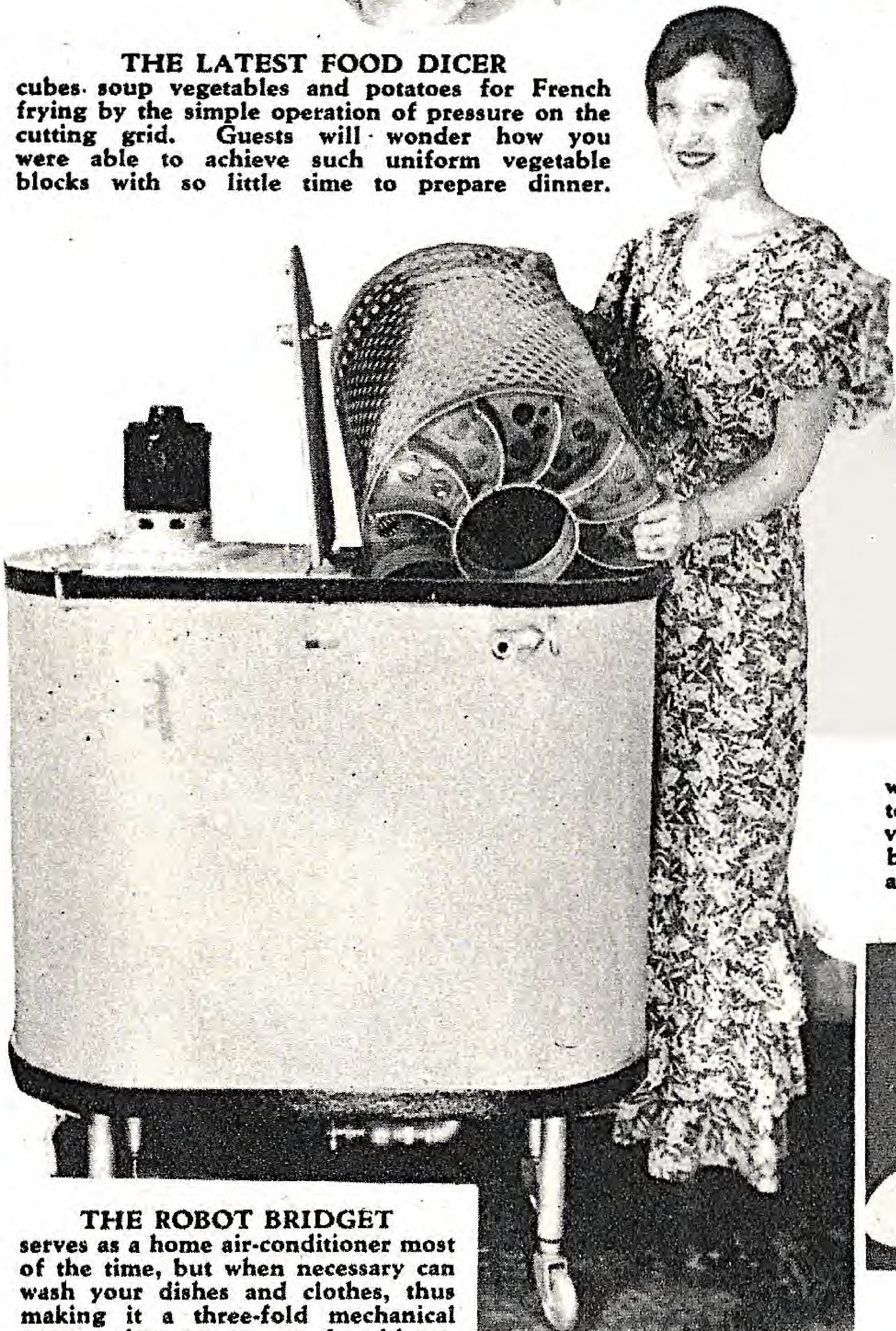
In times of sea mishaps, where it is impossible to launch lifeboats, the kite is put in the air in such a manner that it will fly over the stricken ship. In this manner a lifeline can be strung from one vessel to the other and passengers safely removed from the sinking craft.

Housework Made Easier With New Accessories

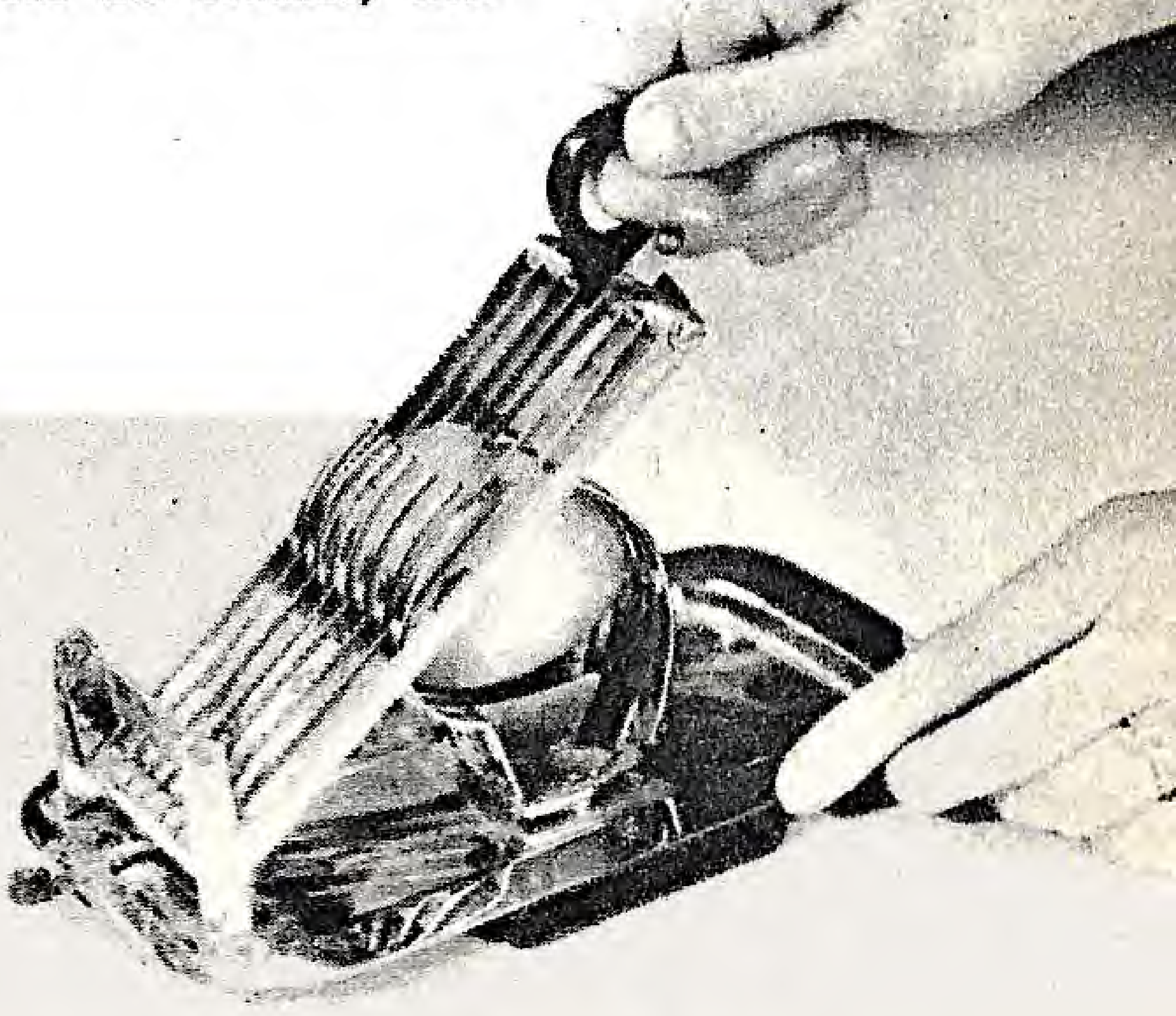


THE LATEST FOOD DICER cubes soup vegetables and potatoes for French frying by the simple operation of pressure on the cutting grid. Guests will wonder how you were able to achieve such uniform vegetable blocks with so little time to prepare dinner.

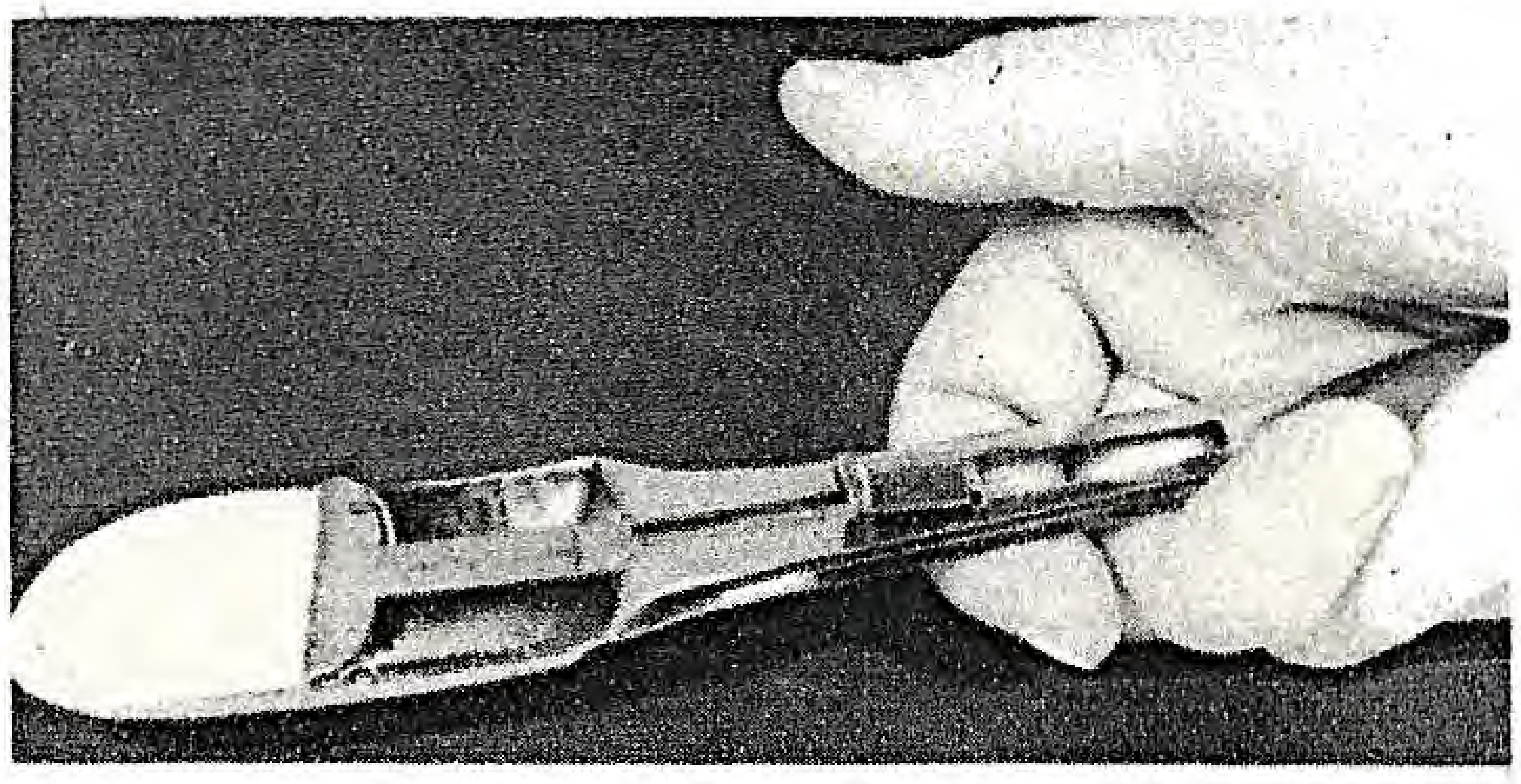
MOTORIZED NAIL FILES are fast becoming a necessary boudoir accessory, for the new machine sings magically over the nail's edge, with none of that unpleasant rasping that comes from the ordinary file.



THE ROBOT BRIDGET serves as a home air-conditioner most of the time, but when necessary can wash your dishes and clothes, thus making it a three-fold mechanical servant that one cannot do without. The major parts are easily removable. When not in use the machine can be compactly stowed in a corner.

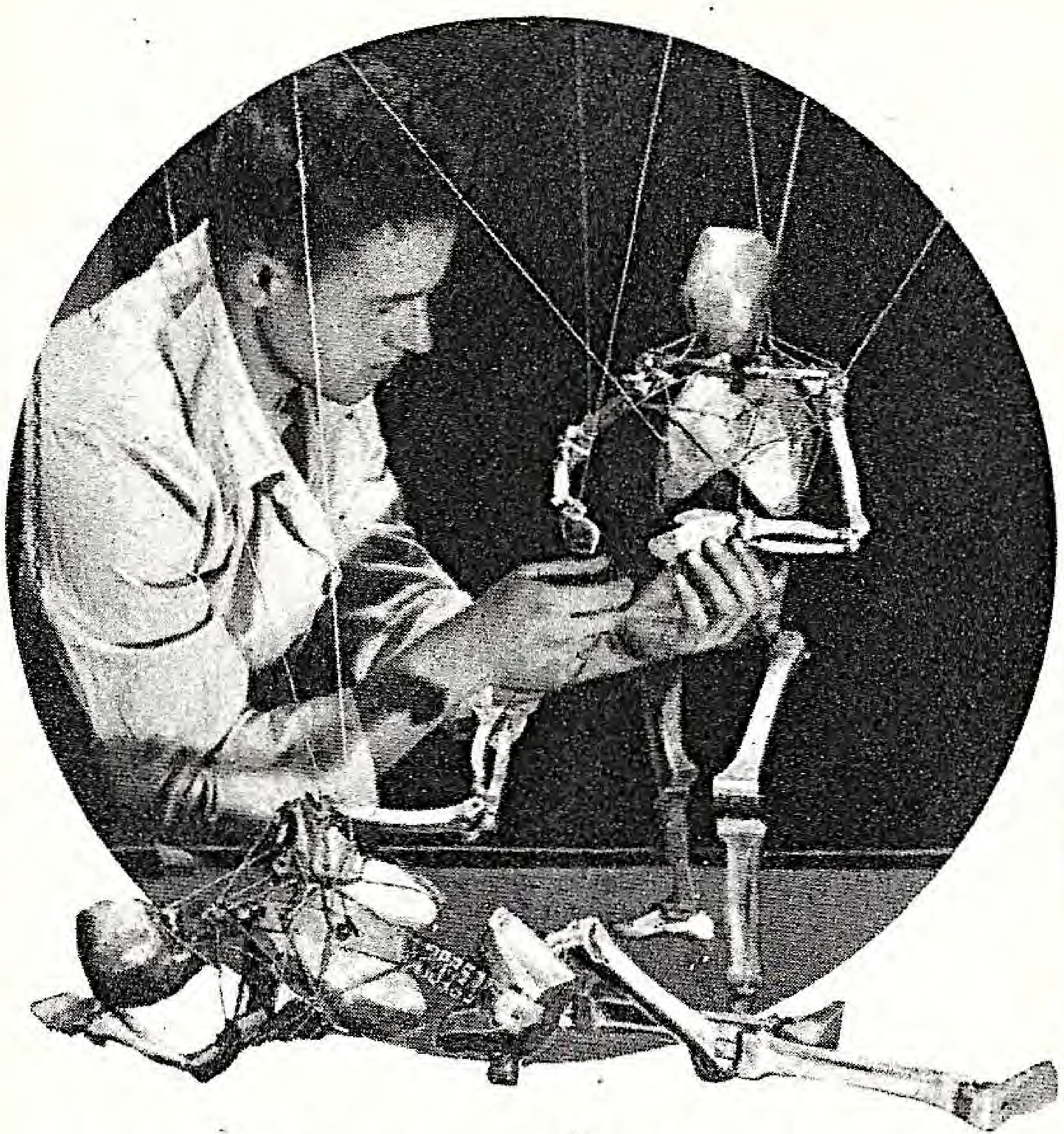


A GANG SAW TOMATO SLICER with adjustable blades insures even slicing of tomatoes, potatoes, oranges, and other fruits and vegetables in the minimum of time. After setting blades to required thickness, they are locked in place and pressed down on the food. A tray catches juices.

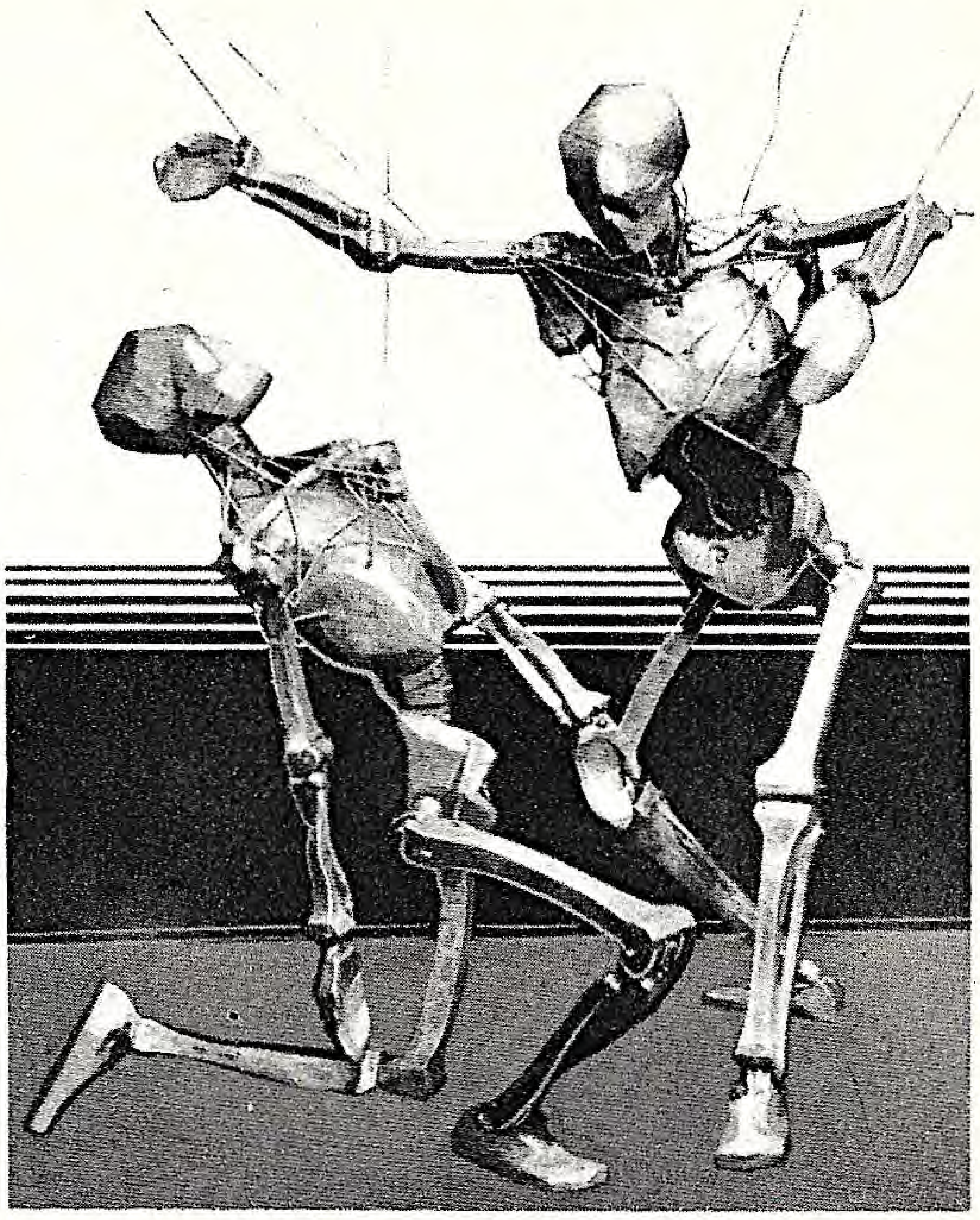


A MEASURING TABLESPOON makes quick work of securing just the right amount of condiments for your favorite dish. A sliding sleeve is graduated to give the correct measures, and as it is pushed forward you know just how much material is left on the spoon.

Metal Figures Duplicate Poses of Human Body for Artists



These metal figurines, invented by a German sculptor, can assume every position of human body in exact accordance with anatomical laws. Artists are using them for models.

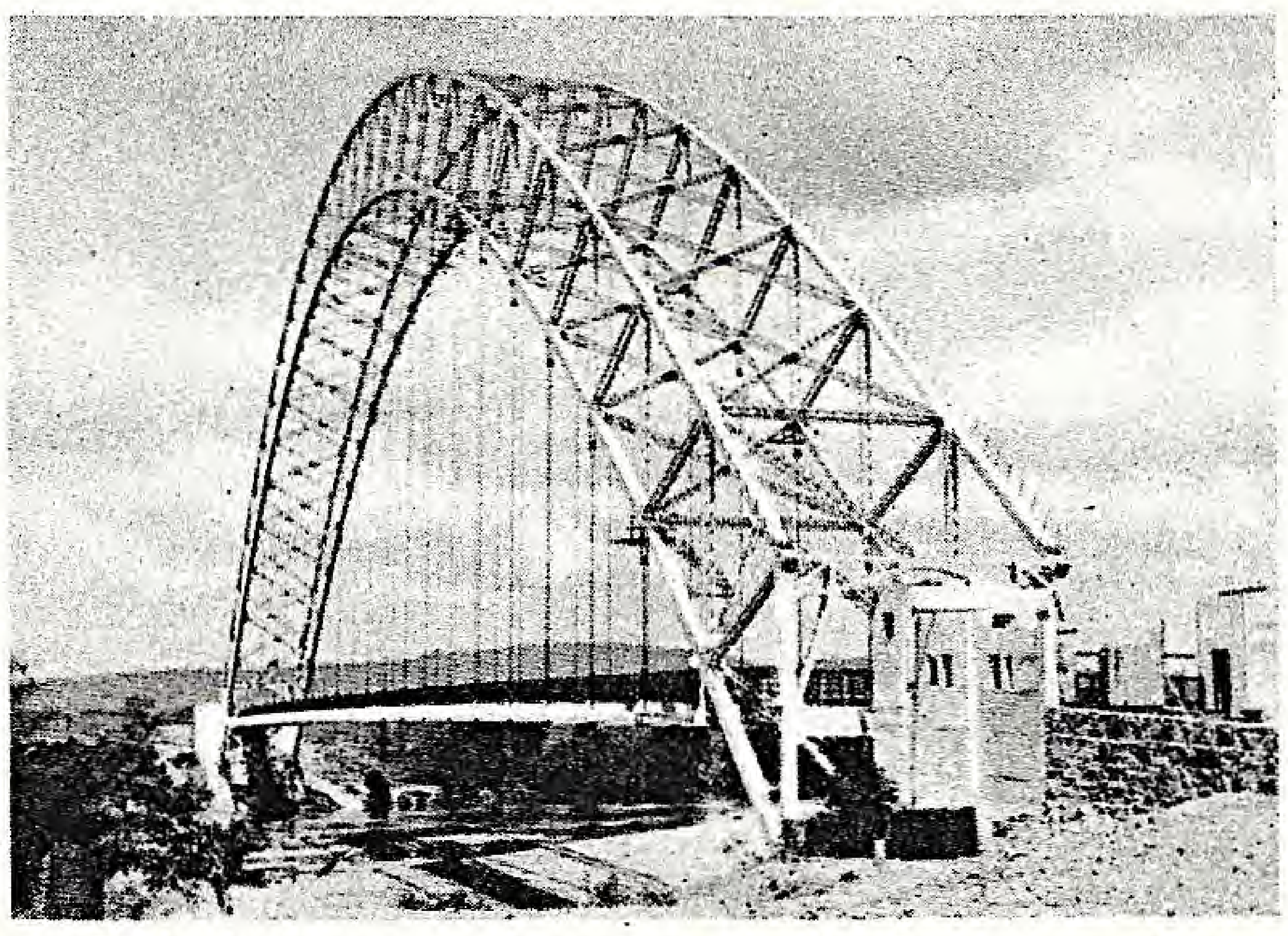


EUROPEAN art students are warmly welcoming the invention of a German sculptor who has been successful in reproducing the moving parts of the human figure in aluminum. The metal figures can be posed in any desired posture, and yet it is impossible for them to assume any position that cannot be duplicated by the human body.

The joints of the models are so composed that they can be moved only according to anatomical laws. Thus the elbow, while free to swing naturally, cannot be bent backwards. Even the movements of the back, neck, head and shoulders are faithfully reproduced. The art students find them an excellent and economical substitute for living models.

Light Steel Makes Bridge Possible

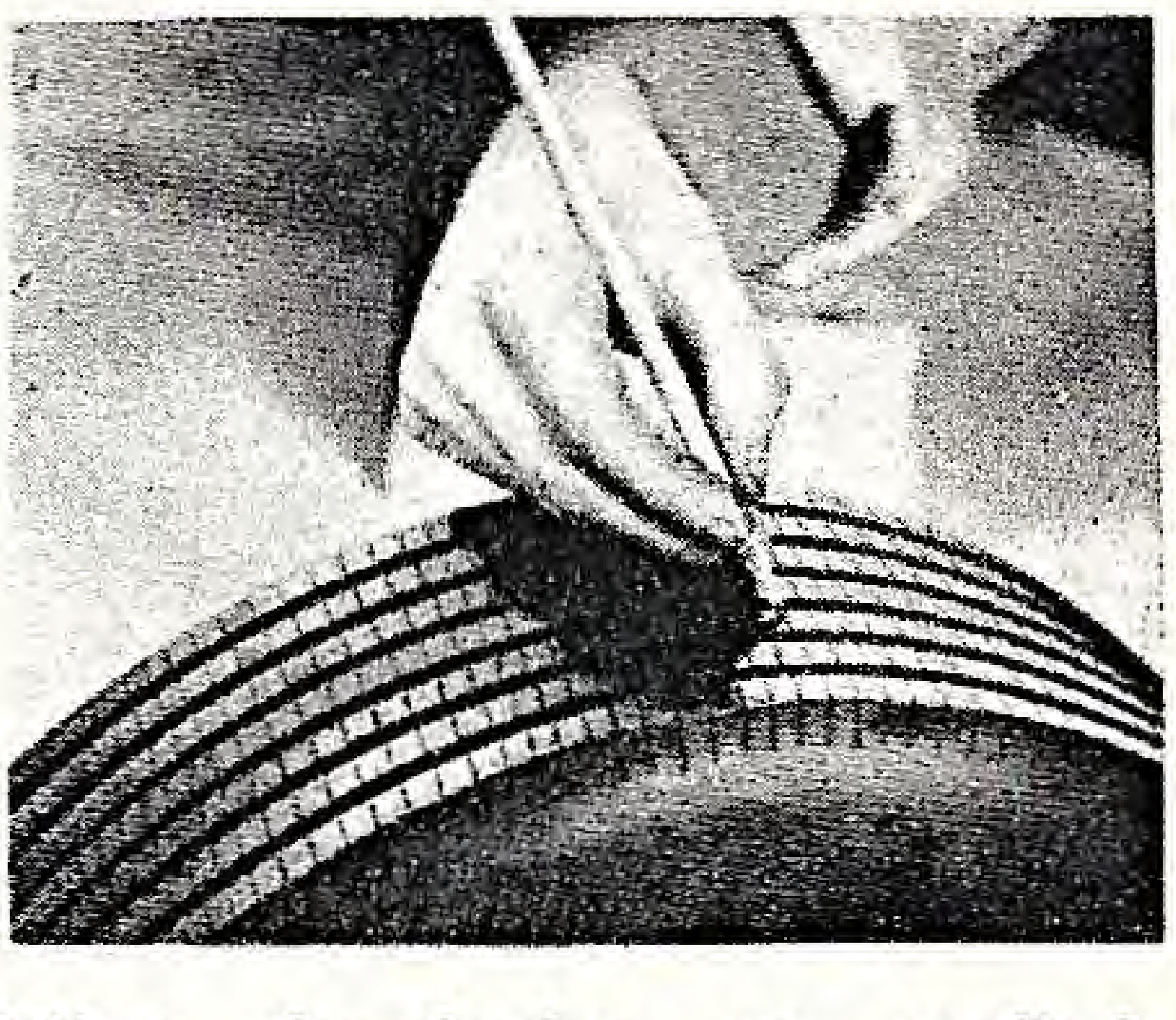
IN THE wilds of the South African jungle there has just been completed the largest single span steel bridge in the world, the Birchenough bridge, 280 feet high with a span of 1,080 feet. Because of the cost of hauling the materials to the site, the bridge was long deemed impossible but modern chemistry soon corrected this fault. A new steel was created strong enough to support the bridge, but so light it could be hauled over the crudest native roads at rates reduced enough to make the bridge possible.



This beautiful arch, rising 280 feet above the Sabi River in South Africa was made possible by a new steel so light it could be hauled to the site without excessive freight costs.

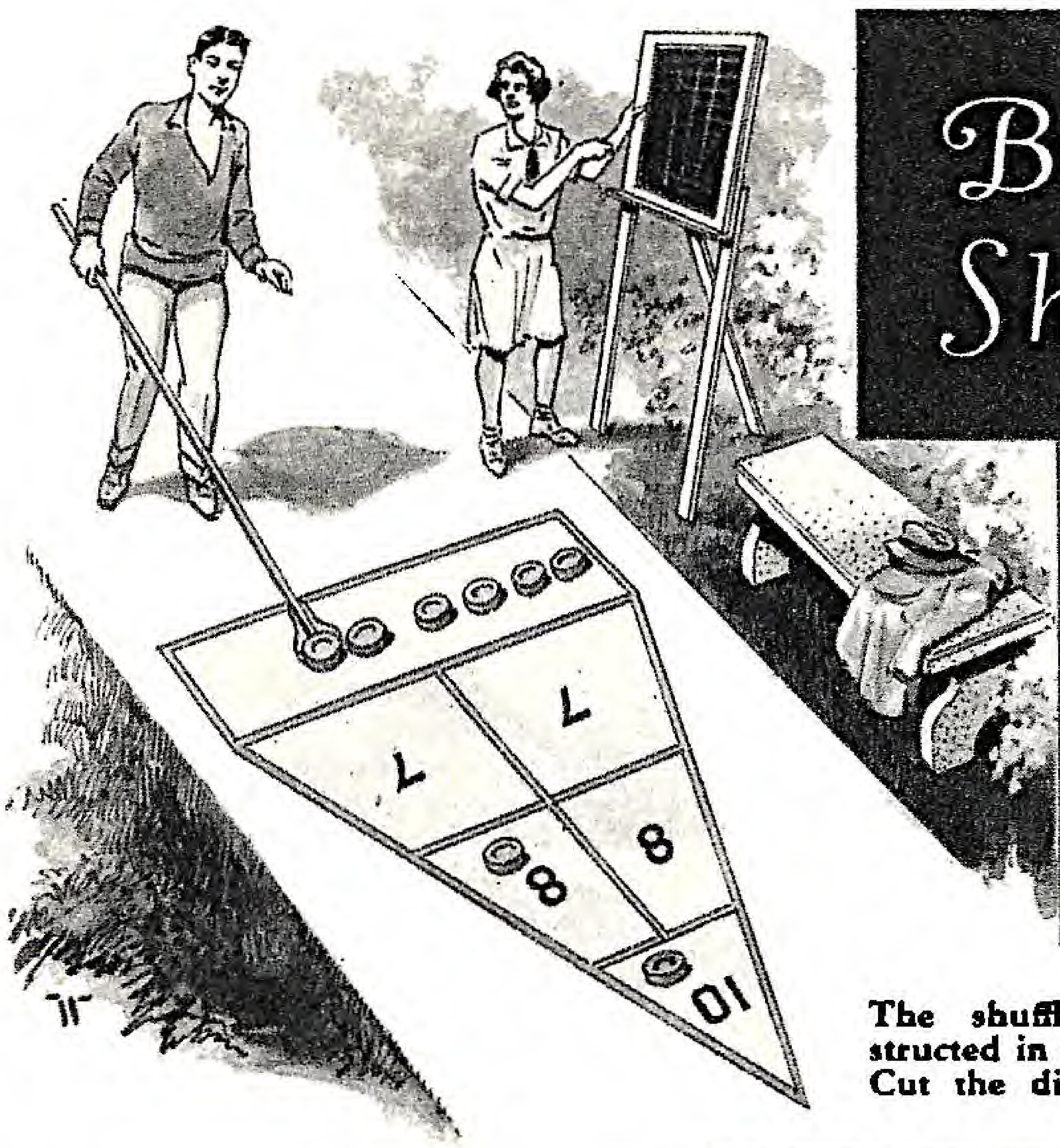
Rubber Fingers Reduce Tire Skid

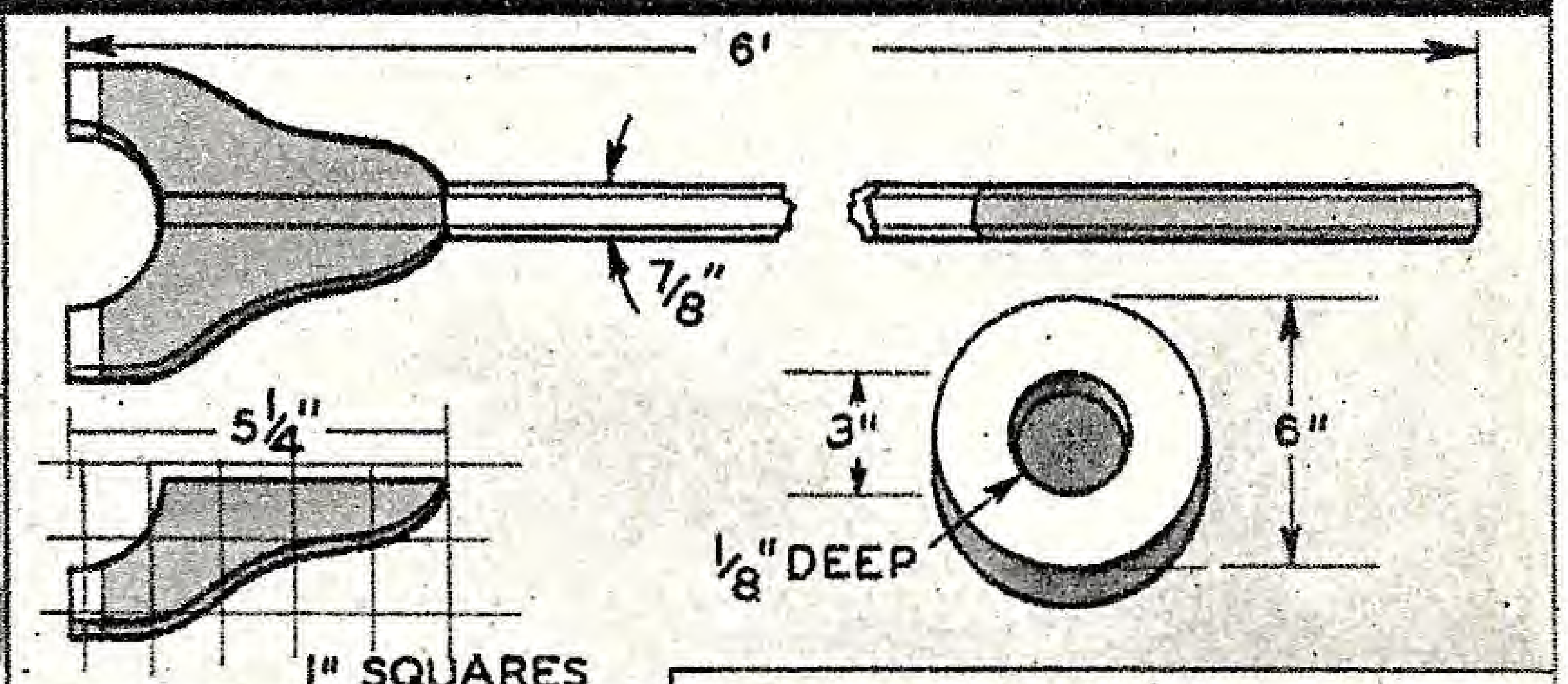
HUNDREDS of rubber fingers, gripping the road in unison, provide the anti-skid features of a new type of tire. On wet pavement, fingers wipe road dry before a skid gets underway.



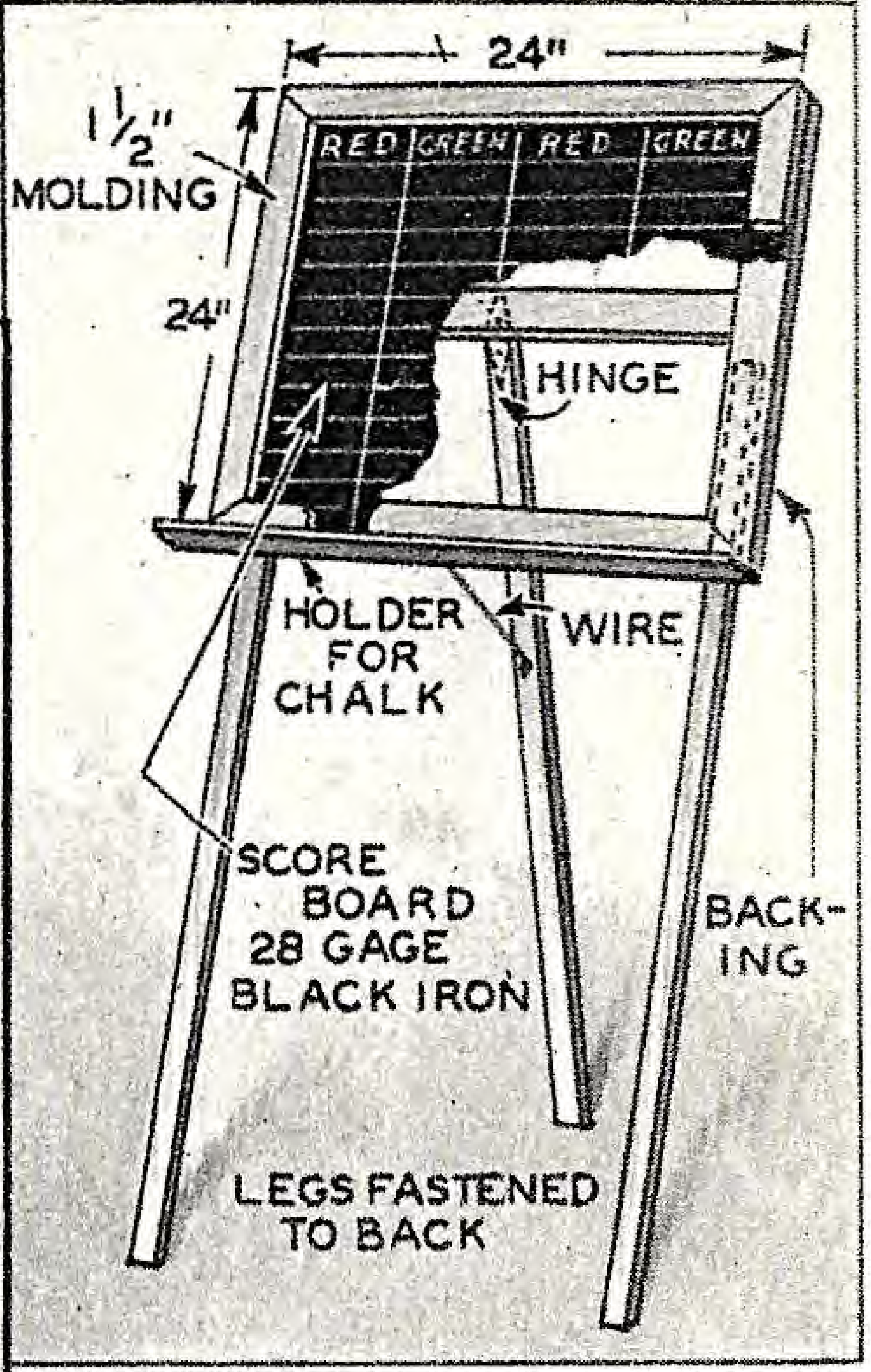
When the brakes are applied, the rubber fingers on the tread of this tire wipe the road dry and then grip it firmly. The tread is silent and vibrationless.

Build This Sidewalk Shuffleboard Game

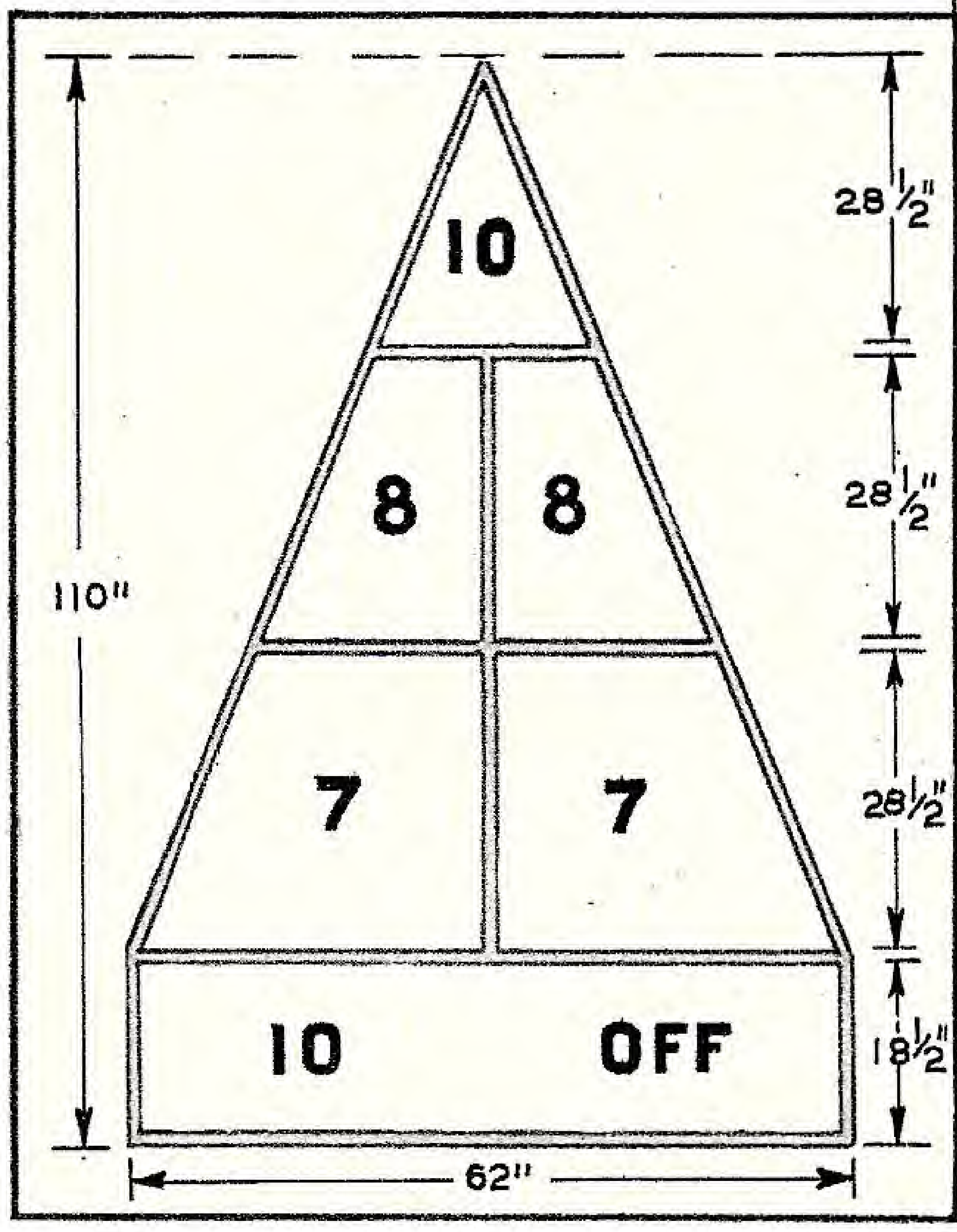



6'
7/8"
5 1/4"
3"
6"
1/8" DEEP
1" SQUARES

The shuffleboard sticks are constructed in the manner shown above. Cut the discs from 3/4 inch stock.


24"
1 1/2" MOLDING
RED
GREEN
RED
GREEN
24"
HINGE
HOLDER FOR CHALK
WIRE
SCORE BOARD 28 GAGE BLACK IRON
BACKING
LEGS FASTENED TO BACK

Lay out court in manner shown at left. The above scoreboard consists of a piece of slate mounted in a frame. It can be hung on a wall or supported by an easel.


10
8
8
7
7
10
OFF
110"
28 1/2"
28 1/2"
28 1/2"
18 1/2"
62"

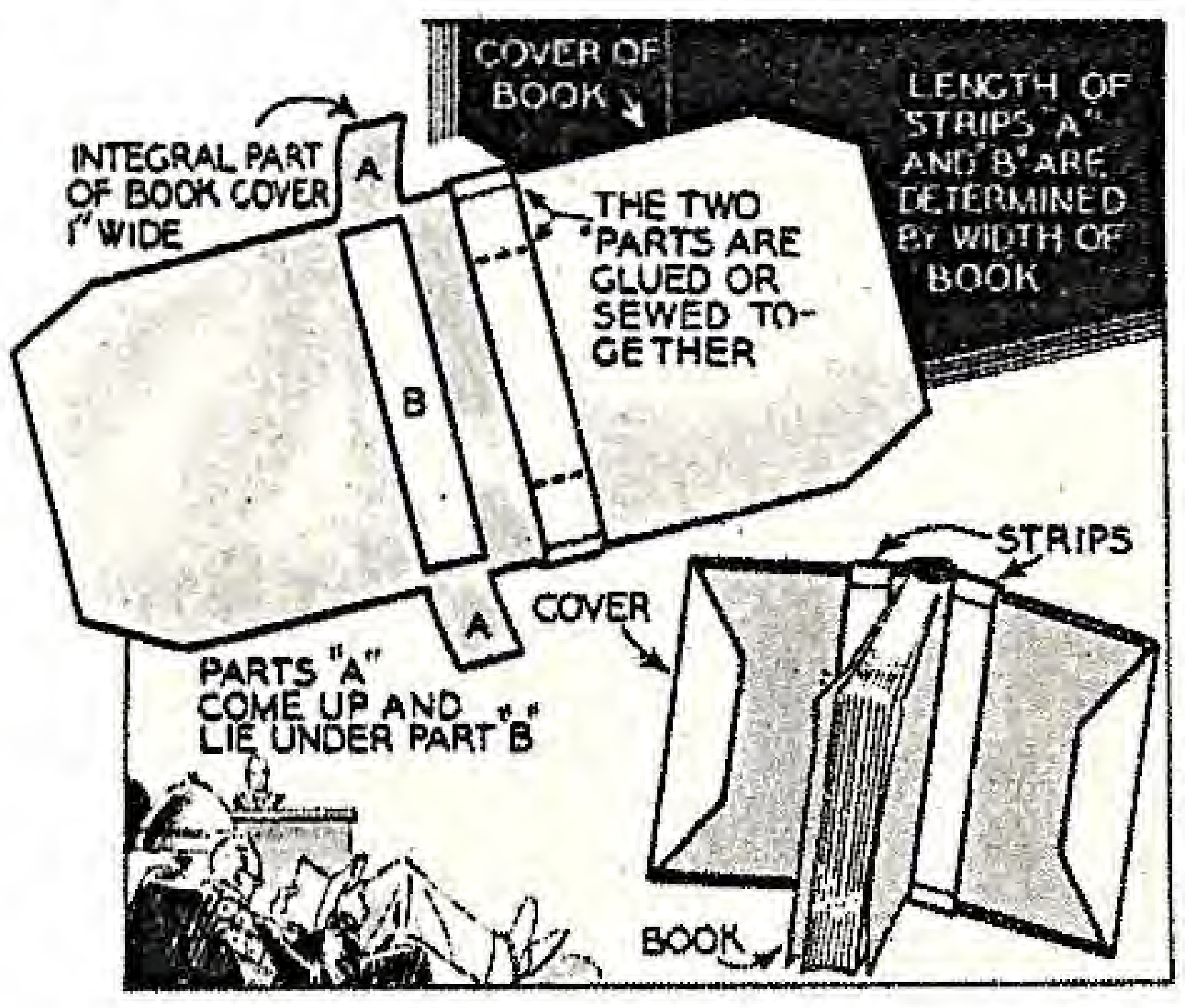
WHENEVER you think of shuffleboard you naturally vision a game on shipboard, but now this interesting pastime has come to dry land. Constructed on a driveway or sidewalk the shuffleboard described here should not cost but a few dollars.

Lay off the playing court following the dimensions given above. Paint the triangle surfaces with a durable white or yellow paint and letter in the numbers as shown. Make the shuffle sticks from six foot lengths of one inch by one inch stock planned to octagon shape. To the ends of each stick attach a tip, these being constructed from 3/4-inch stock and cut out on a scroll saw.

Make the discs six inches in diameter and of 3/4-inch stock. A recess cut in the top reduces their weight. Give the top and sides of all eight discs a coat of shellac leaving the bottom unfinished. Paint the recess of four of the discs green with the other four identified by red. Corn meal sprinkled on the court will make the discs slide freely.

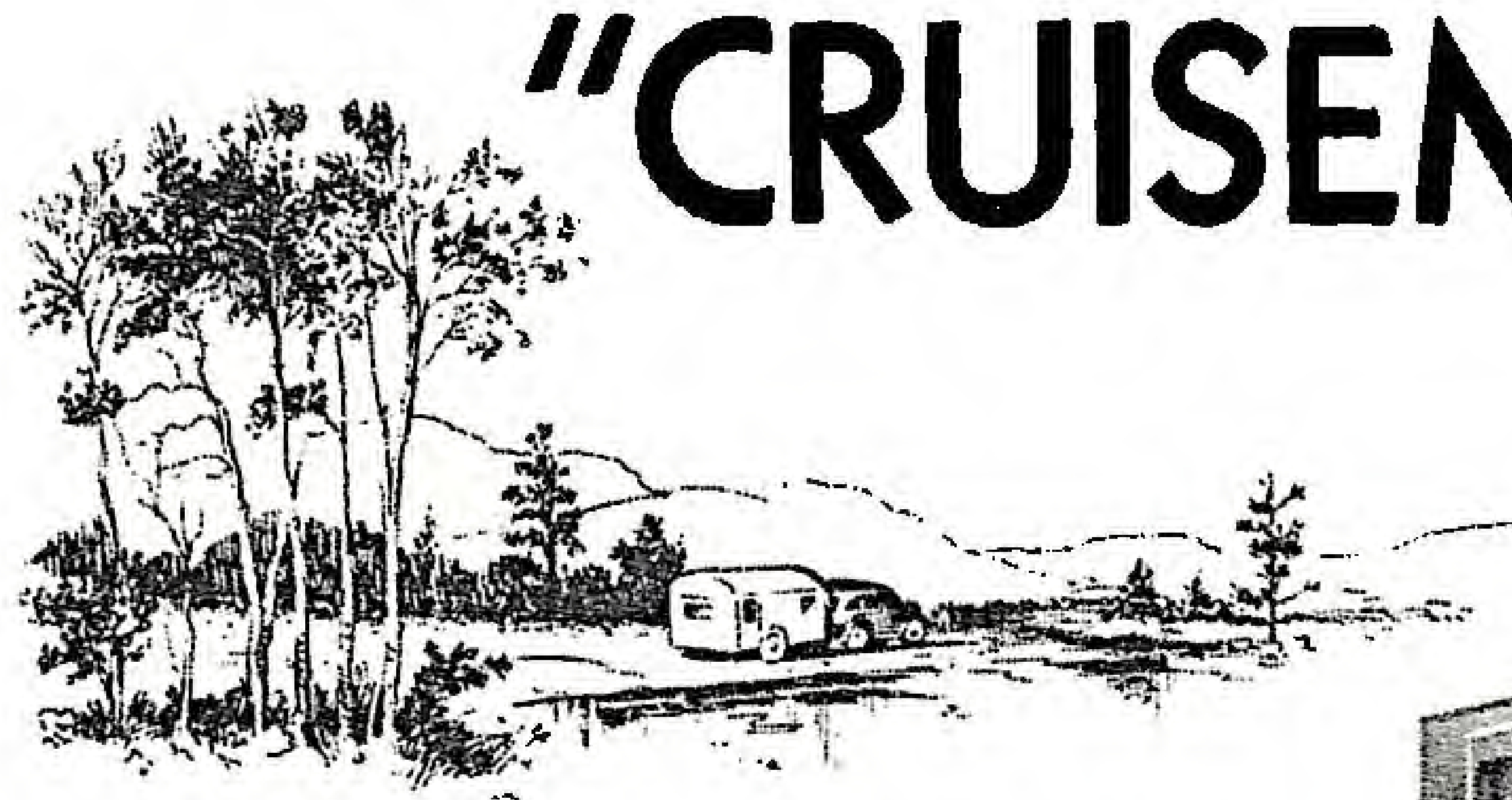
The object of the game is to push your four discs into the numbered areas and score higher than your opponent. Ten frames constitutes a game. Discs going on lines do not count. Failing to push a disc out of the "off" zone deducts 10 from your score.

Non-Slip Cover Protects New Books


COVER OF BOOK
INTEGRAL PART OF BOOK COVER 1" WIDE
A
B
THE TWO PARTS ARE GLUED OR SEWED TOGETHER
LENGTH OF STRIPS "A" AND "B" ARE DETERMINED BY WIDTH OF BOOK
STRIPS
A
COVER
PARTS "A" COME UP AND LIE UNDER PART "B"
BOOK

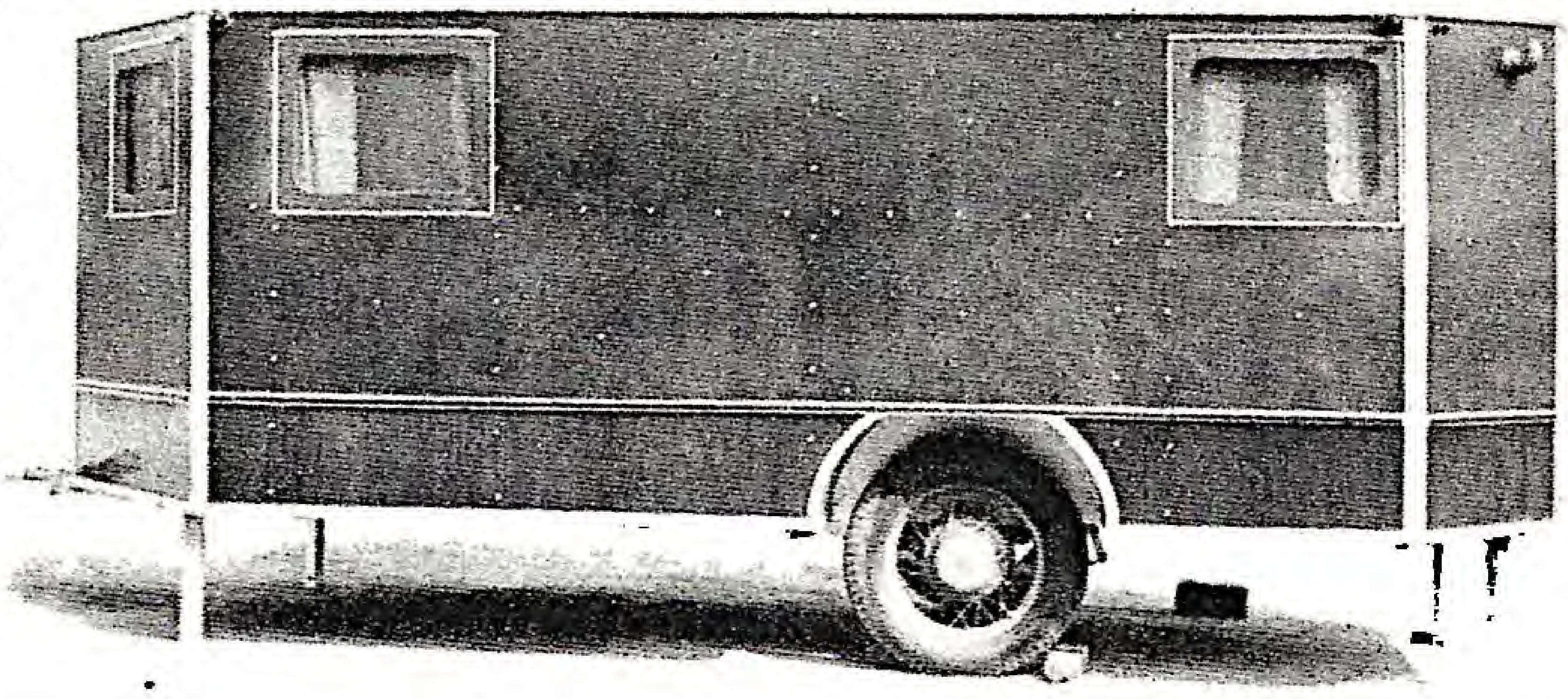
Made of either starched cloth or heavy paper this simple cover protects valuable volumes from wear.

VALUABLE books may be protected against excess wear by providing them with a cover that will remain in position at all times. The cover can be made of either heavy paper or starched cloth. Cut the material to the shape shown making its dimensions to meet the book's requirements.

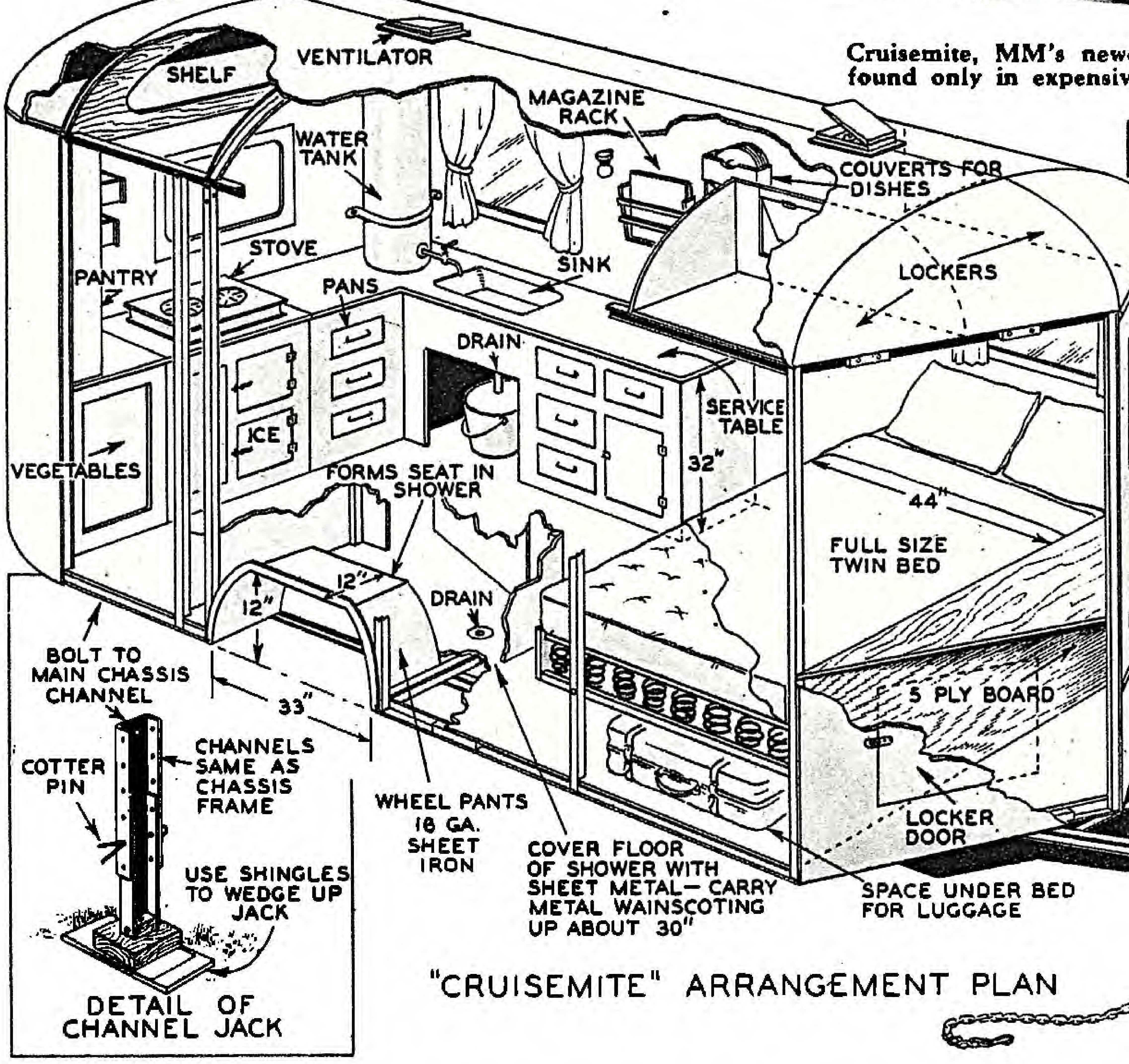


"CRUISEMITE"—THE IDEAL

Designed for the person whose income is limited this camping coach is unique. It is of all-steel construction, yet costs no more than inferior types.

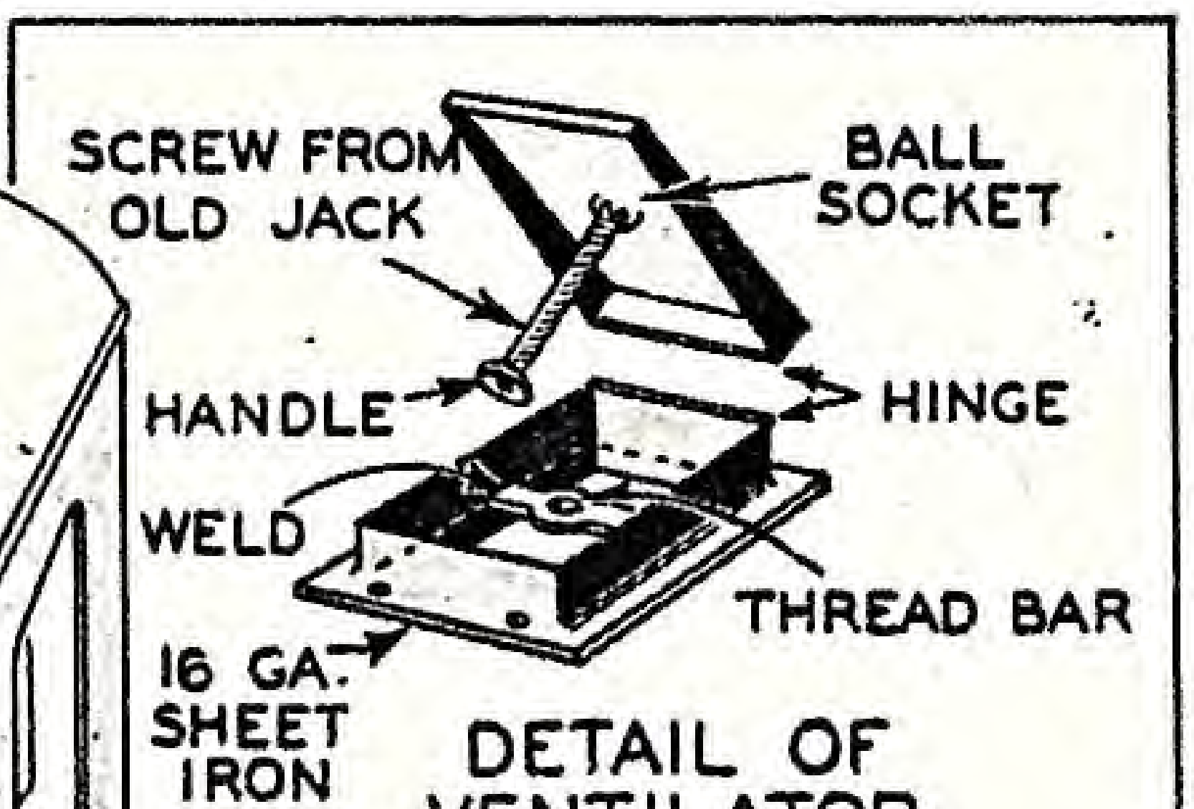


Cruisemite, MM's newest trailer featuring conveniences found only in expensive types, as it appears completed.



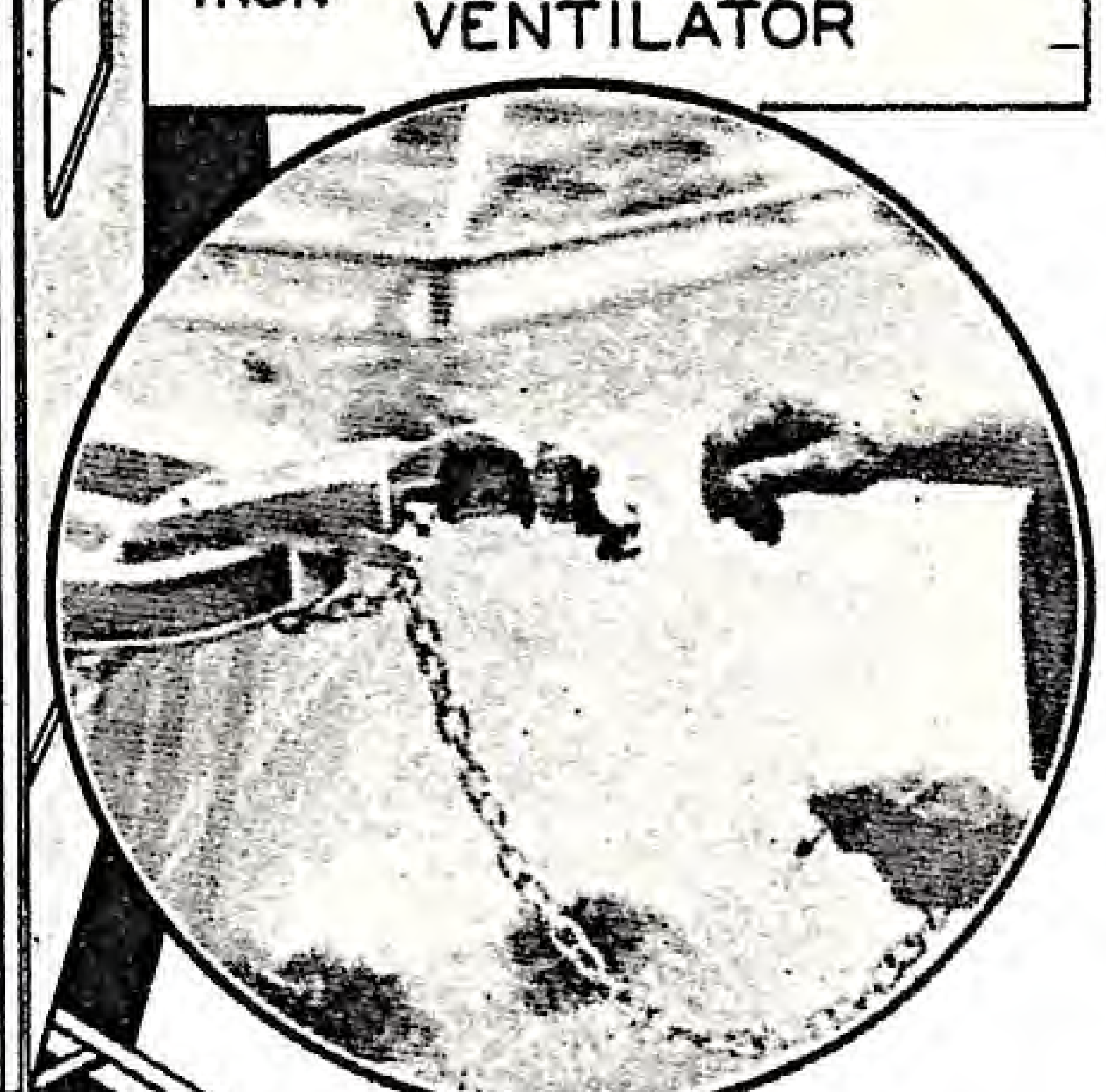
SHELF
VENTILATOR
MAGAZINE RACK
WATER TANK
STOVE
PANTRY
PANS
SINK
COUVERTS FOR DISHES
LOCKERS
DRAIN
SERVICE TABLE
ICE
VEGETABLES
FORMS SEAT IN SHOWER
32"
44"
FULL SIZE TWIN BED
12"
12"
DRAIN
33"
5 PLY BOARD
BOLT TO MAIN CHASSIS CHANNEL
COTTER PIN
CHANNELS SAME AS CHASSIS FRAME
USE SHINGLES TO WEDGE UP JACK
DETAIL OF CHANNEL JACK
WHEEL PANTS 18 GA. SHEET IRON
COVER FLOOR OF SHOWER WITH SHEET METAL—CARRY METAL WAINSCOTING UP ABOUT 30"
LOCKER DOOR
SPACE UNDER BED FOR LUGGAGE

"CRUISEMITE" ARRANGEMENT PLAN



SCREW FROM OLD JACK
BALL SOCKET
HANDLE
HINGE
WELD
THREAD BAR
16 GA. SHEET IRON

DETAIL OF VENTILATOR



On the original "Cruisemite" this form of trailer hitch was used. Being of the ball and socket type the trailer hauled smoothly without the effects of slack jarring it into motion.

THE trailer industry having grown by leaps and bounds during the past few years it is difficult to determine just which type to build. While there are streamline trailers, folding trailers, long trailers, semi-trailers and any number of in between types "Cruisemite" is a practical coach for home construction. It has been seasoned by thorough testing and free from undesirable features.

"Cruisemite" may be built in several ways, with any number of interior plans. That's half the fun of building a trailer: planning the interior yourself. A good standard layout is shown in the plans.

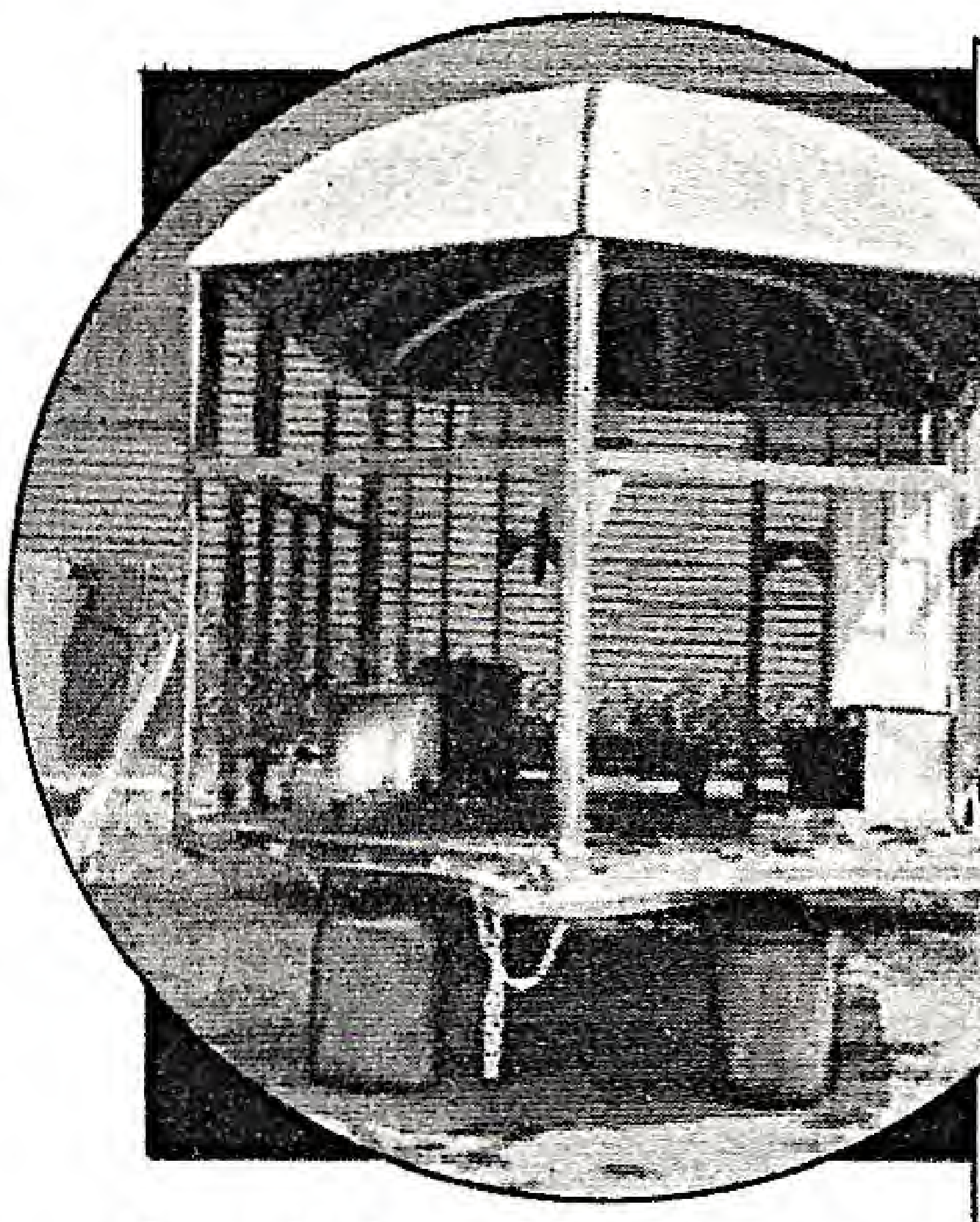
The secret of the easy-to-build part of "Cruisemite" is that she has a steel chassis roof frame. This is welded up out of standard steel channels and angles obtainable at any building supply dealer. A blacksmith can be called upon to bend up the materials and weld the frames. Being of steel, "Cruisemite's" construction is very strong, as well as being very light.

The main chassis frame is of channel iron of 2½" deep as shown on the perspective

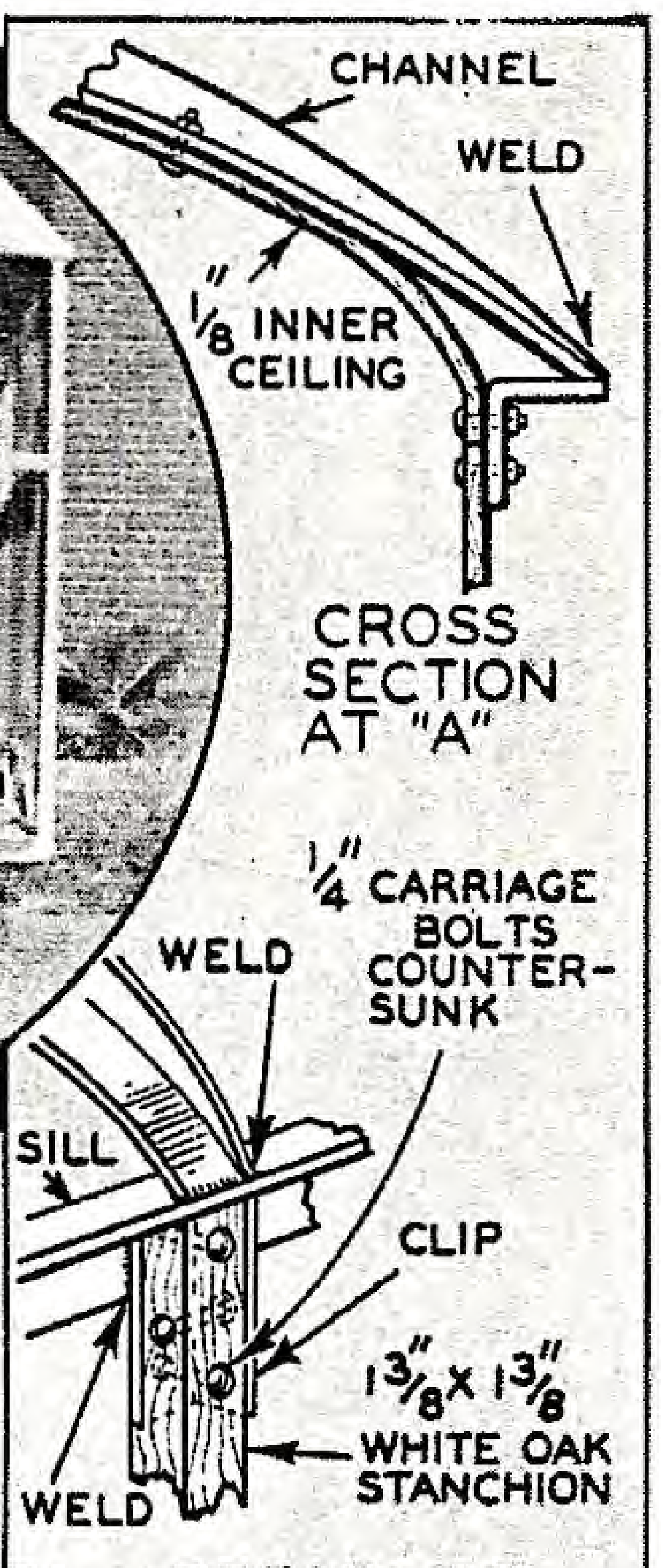
HIGHWAY TRAILER HOME

drawing. Lay out the half breadth dimensions and chassis frame lengths in chalk on the cement floor of the garage. Have the channel bent in the middle and at section B to coincide with the floor plan. The bend in the middle is to a radius of 8″, making a sixteen-inch loop into which the trailer hitch is later fastened.

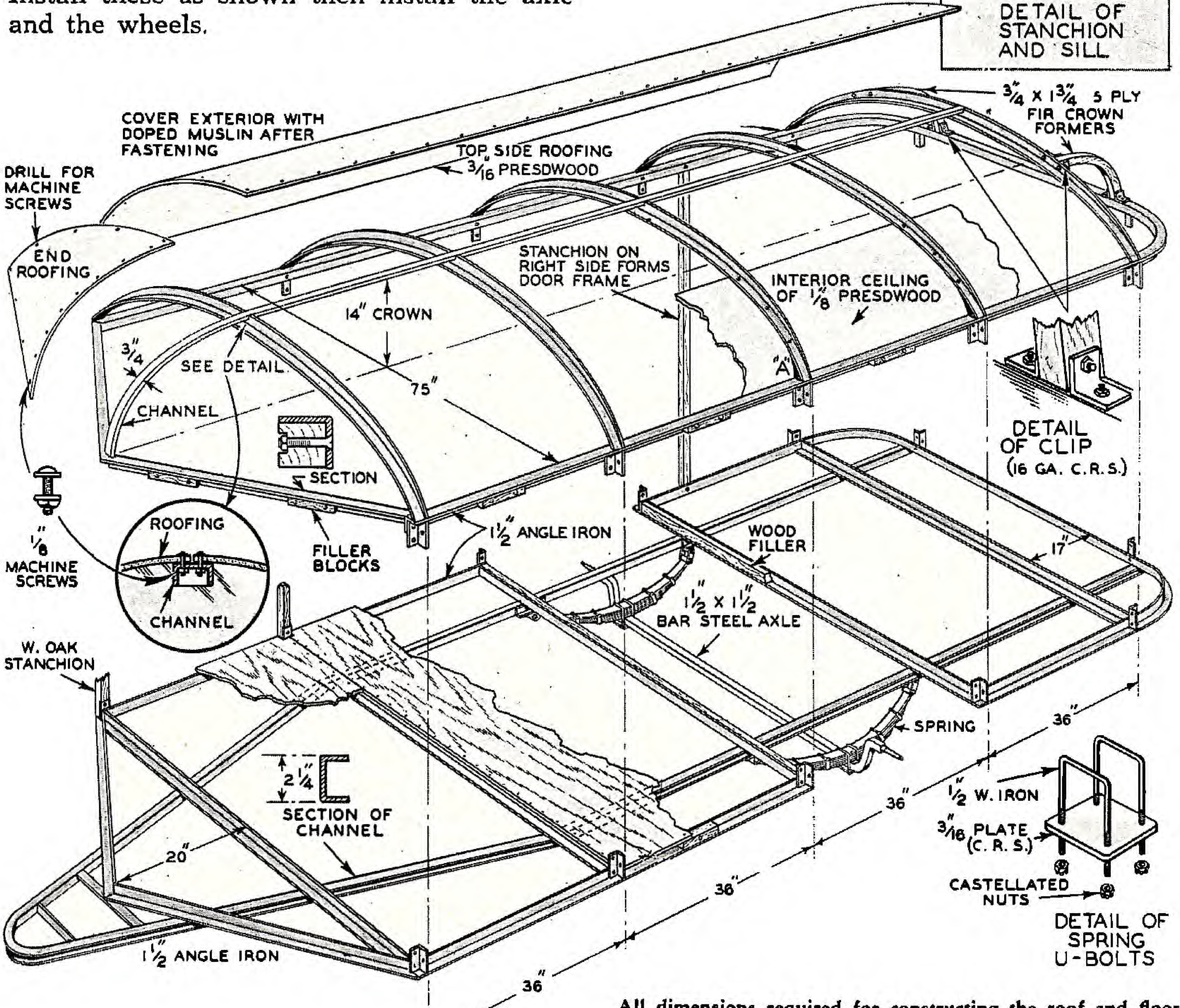
Lay the main chassis frame on the floor, and using the chalk outlines as a guide, weld in the cross members, the outside edge angle iron as shown on the drawings and also the clips. These clips are of the same material, 1⅜″ by 1⅜″ angle iron and about 4″ long. When this work has been completed turn the frame upside down and weld in the angle irons and the plates for the spring perches. The spring used is a 28″ Chevrolet truck type with 4″ shackles to allow a soft riding motion. Install these as shown then install the axle and the wheels.



Here is the trailer as it appears before ceiling process has been started. Note the roof in place.


CHANNEL
WELD
⅛″ INNER CEILING
CROSS SECTION AT "A"
¼″ CARRIAGE BOLTS COUNTER-SUNK
WELD
SILL
CLIP
1⅜″x 1⅜″
WHITE OAK STANCHION
WELD

DETAIL OF STANCHION AND SILL


COVER EXTERIOR WITH DOPED MUSLIN AFTER FASTENING
DRILL FOR MACHINE SCREWS
TOP SIDE ROOFING 3/16″ PRESDWOOD
¾″ x 1¾″ 5 PLY FIR CROWN FORMERS
END ROOFING
STANCHION ON RIGHT SIDE FORMS DOOR FRAME
INTERIOR CEILING OF ⅛″ PRESDWOOD
14″ CROWN
¾″
SEE DETAIL
75″
"A"
CHANNEL
SECTION
DETAIL OF CLIP (16 GA. C.R.S.)
ROOFING
1½″ ANGLE IRON
WOOD FILLER
⅛″ MACHINE SCREWS
FILLER BLOCKS
17″
CHANNEL
1½″ x 1½″ BAR STEEL AXLE
W. OAK STANCHION
SPRING
36″
2¼″
½″ W. IRON
SECTION OF CHANNEL
36″
3/16″ PLATE (C. R. S.)
20″
CASTELLATED NUTS
36″
DETAIL OF SPRING U-BOLTS
1½″ ANGLE IRON
36″

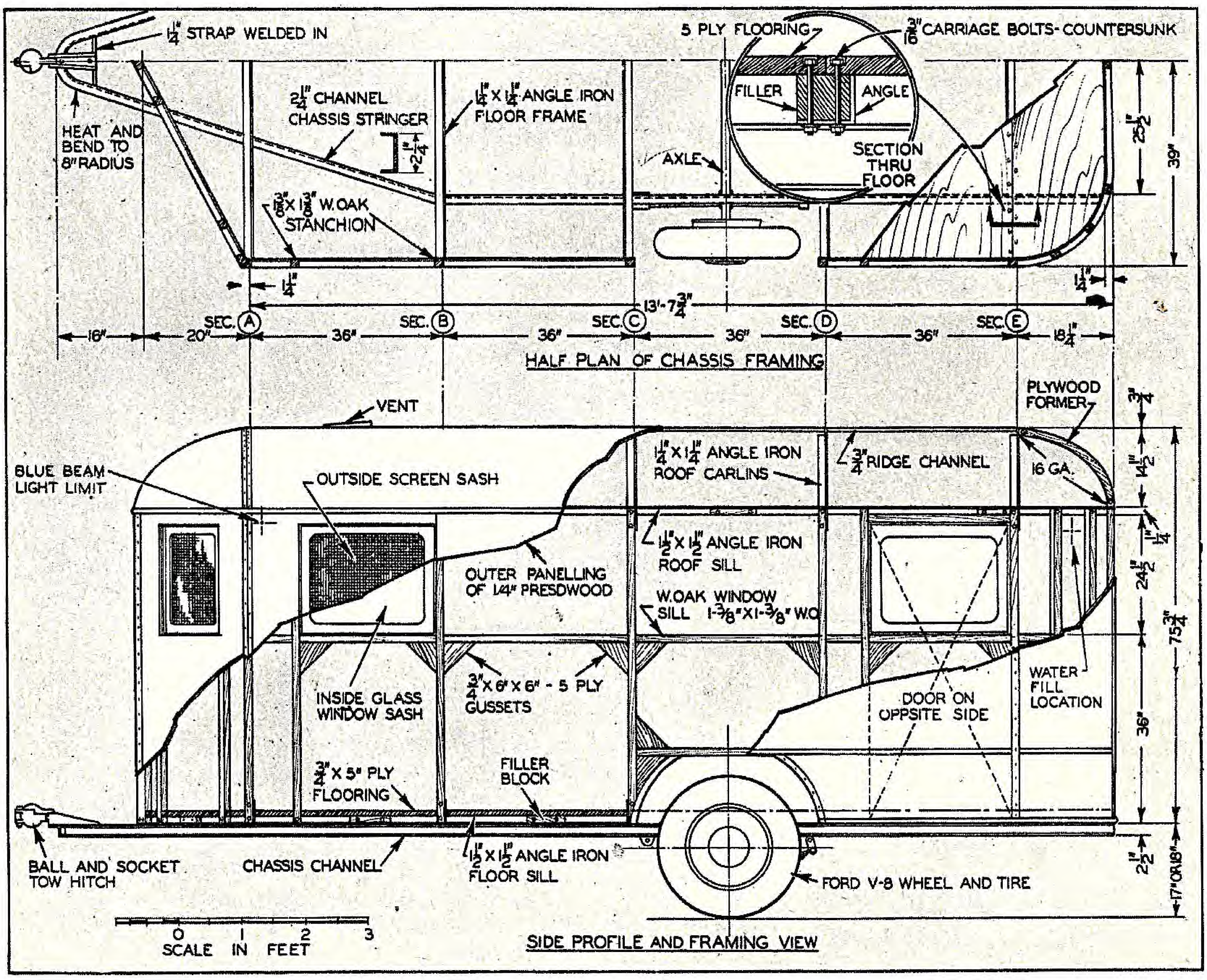
All dimensions required for constructing the roof and floor framework are given in above diagram. Channel and angle iron welded to the required forms constitute the chassis.

Home on Wheels Offers Many Conveniences

It is suggested that you use a manufactured axle as this will have the ends machined for the spindle, and upset. However, any blacksmith can make you a steel axle with spindle ends for a pair of Ford V-8 front wheels and upset them for the spring depth. The axle must be upset as the bar must pass under the spring. This is not only good mechanical sense, but in many states it is law.

Make the standing jacks, as shown in the detail, next so that the wheels can be fastened on the spindle, packed with grease, and permanently installed. The frame completed, construction is started on the roof. The frame for the roof is built as shown in the perspective detail drawing. The roof beams are tapered on the top edge, either by weld-cutting and grinding smooth, or hot shearing so that at a foot from either side of the center line they taper to nothing at the ends. They can be bent to an absolute crown of 14″ or a coach crown whichever is desired. Weld the beams, saw out for the ¾″ center or ridge pole channel and weld in the stanchion clips.

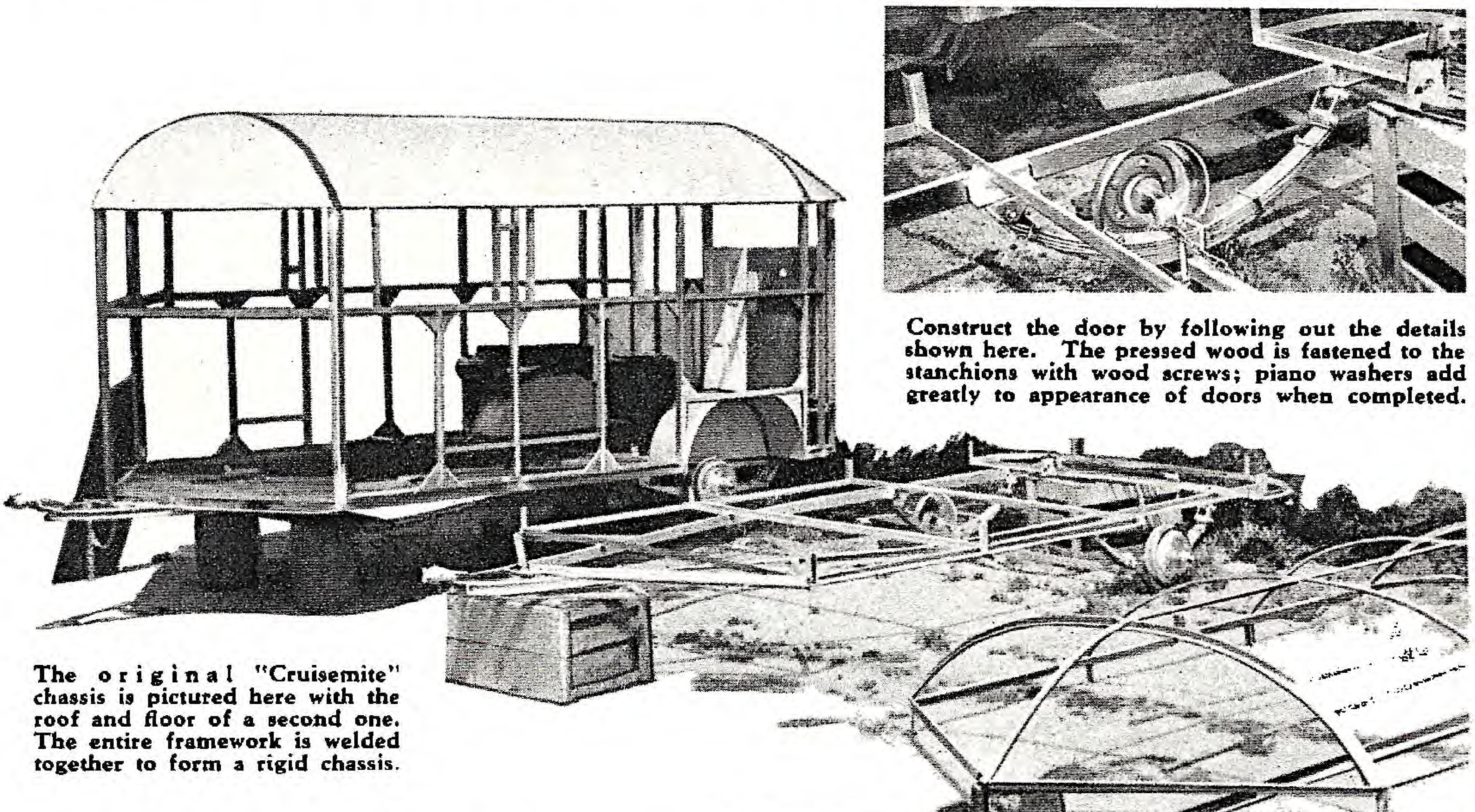
You will need 20 (twenty) 1⅜″ by 1⅜″ white oak pieces planed four sides and finished to a maximum of 6″ more or 4″ less than 5¼″, depending upon the height desired. At this stage of construction procure about four or five small C clamps and with the help of a few friends fasten the stanchions at sections A and E of the chassis frame which has been jacked up level. Install with ¼″ bolts, countersunk as shown, two transversely and one plain longitudinally. You can bore through the clips easier if an electric drill is used. Plumb the stanchions before final bolting, and then get your friendly help to assist in hoisting the roof truss. This will set on the erected stanchions. It also must be faired and



1¼″ STRAP WELDED IN
HEAT AND BEND TO 8″ RADIUS
2¼″ CHANNEL CHASSIS STRINGER
2¼″
1¼″ X 1¼″ ANGLE IRON FLOOR FRAME
1⅜″ X 1⅜″ W. OAK STANCHION
AXLE
5 PLY FLOORING
3/16″ CARRIAGE BOLTS-COUNTERSUNK
FILLER
ANGLE
SECTION THRU FLOOR
25½″
39″
1¼″
1¼″
13′-7¾″
SEC. A
SEC. B
SEC. C
SEC. D
SEC. E
16″
20″
36″
36″
36″
36″
18¼″
HALF PLAN OF CHASSIS FRAMING
VENT
PLYWOOD FORMER
¾″
BLUE BEAM LIGHT LIMIT
OUTSIDE SCREEN SASH
1¼″ X 1¼″ ANGLE IRON ROOF CARLINS
¾″ RIDGE CHANNEL
16 GA.
14½″
1¼″
1½″ X 1½″ ANGLE IRON ROOF SILL
OUTER PANELLING OF 1/4″ PRESDWOOD
W. OAK WINDOW SILL 1-⅜″X1-⅜″ W.O
24½″
75¾″
INSIDE GLASS WINDOW SASH
¾″ X 6″ X 6″ - 5 PLY GUSSETS
DOOR ON OPPSITE SIDE
WATER FILL LOCATION
36″
¾″ X 5″ PLY FLOORING
FILLER BLOCK
BALL AND SOCKET TOW HITCH
CHASSIS CHANNEL
1½″ X 1½″ ANGLE IRON FLOOR SILL
FORD V-8 WHEEL AND TIRE
2½″
17″ OR 18″
0 1 2 3
SCALE IN FEET
SIDE PROFILE AND FRAMING VIEW

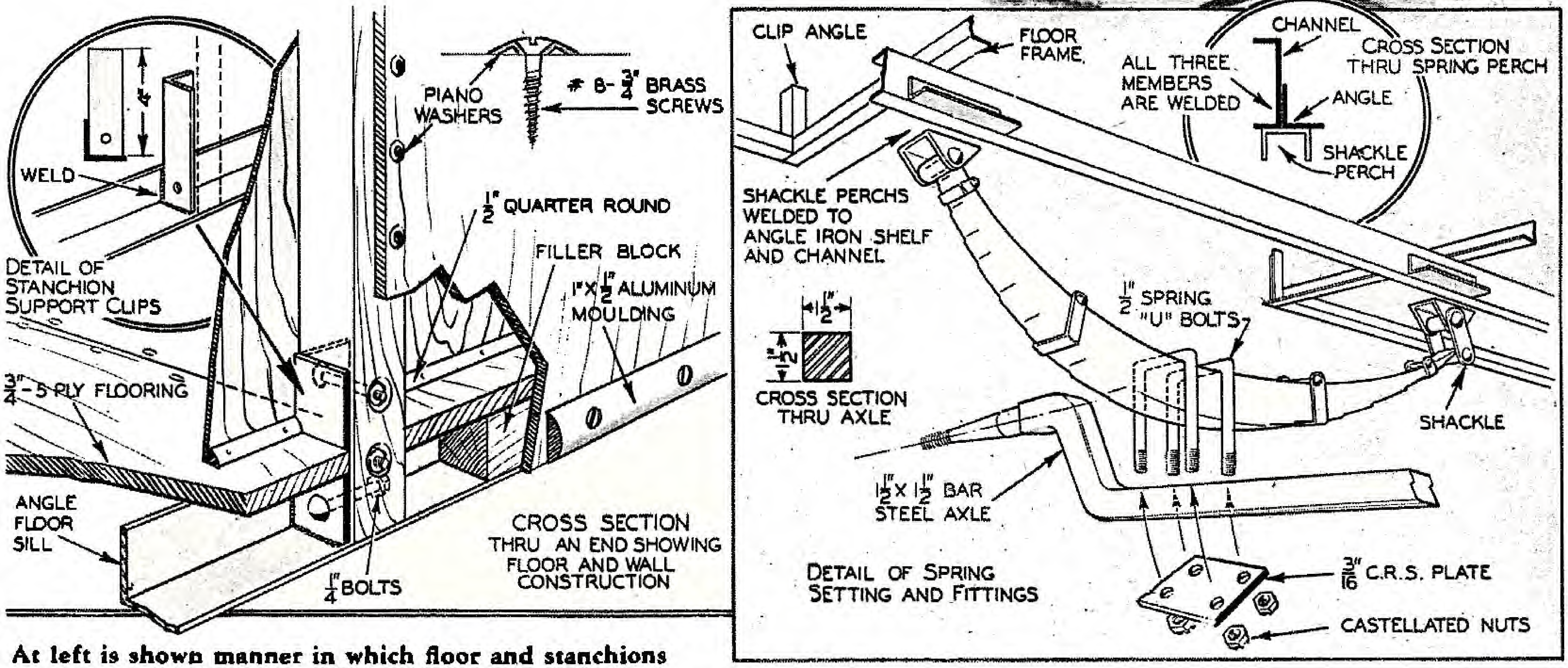
Details of the chassis framing are clearly shown here. The builder is cautioned not to alter the basic design of the craft except for the stanchions which can be altered to provide the necessary headroom. Pants of galvanized iron are attached over the wheels to improve the trailer's appearance. A commercial pressed wood material is used for side construction.

Trailer Frame Is Of All-Metal Construction



Construct the door by following out the details shown here. The pressed wood is fastened to the stanchions with wood screws; piano washers add greatly to appearance of doors when completed.

The original "Cruisemite" chassis is pictured here with the roof and floor of a second one. The entire framework is welded together to form a rigid chassis.


WELD
4"
DETAIL OF STANCHION SUPPORT CLIPS
3/4"-5 PLY FLOORING
ANGLE FLOOR SILL
1/4" BOLTS
PIANO WASHERS
#8-3/4" BRASS SCREWS
1/2" QUARTER ROUND
FILLER BLOCK
1"X1/2" ALUMINUM MOULDING
CROSS SECTION THRU AN END SHOWING FLOOR AND WALL CONSTRUCTION
CLIP ANGLE
FLOOR FRAME
CHANNEL
ALL THREE MEMBERS ARE WELDED
CROSS SECTION THRU SPRING PERCH
ANGLE
SHACKLE PERCH
SHACKLE PERCHS WELDED TO ANGLE IRON SHELF AND CHANNEL
1 1/2"
1 1/2"
CROSS SECTION THRU AXLE
1/2" SPRING "U" BOLTS
SHACKLE
1 1/2" X 1 1/2" BAR STEEL AXLE
DETAIL OF SPRING SETTING AND FITTINGS
3/16" C.R.S. PLATE
CASTELLATED NUTS

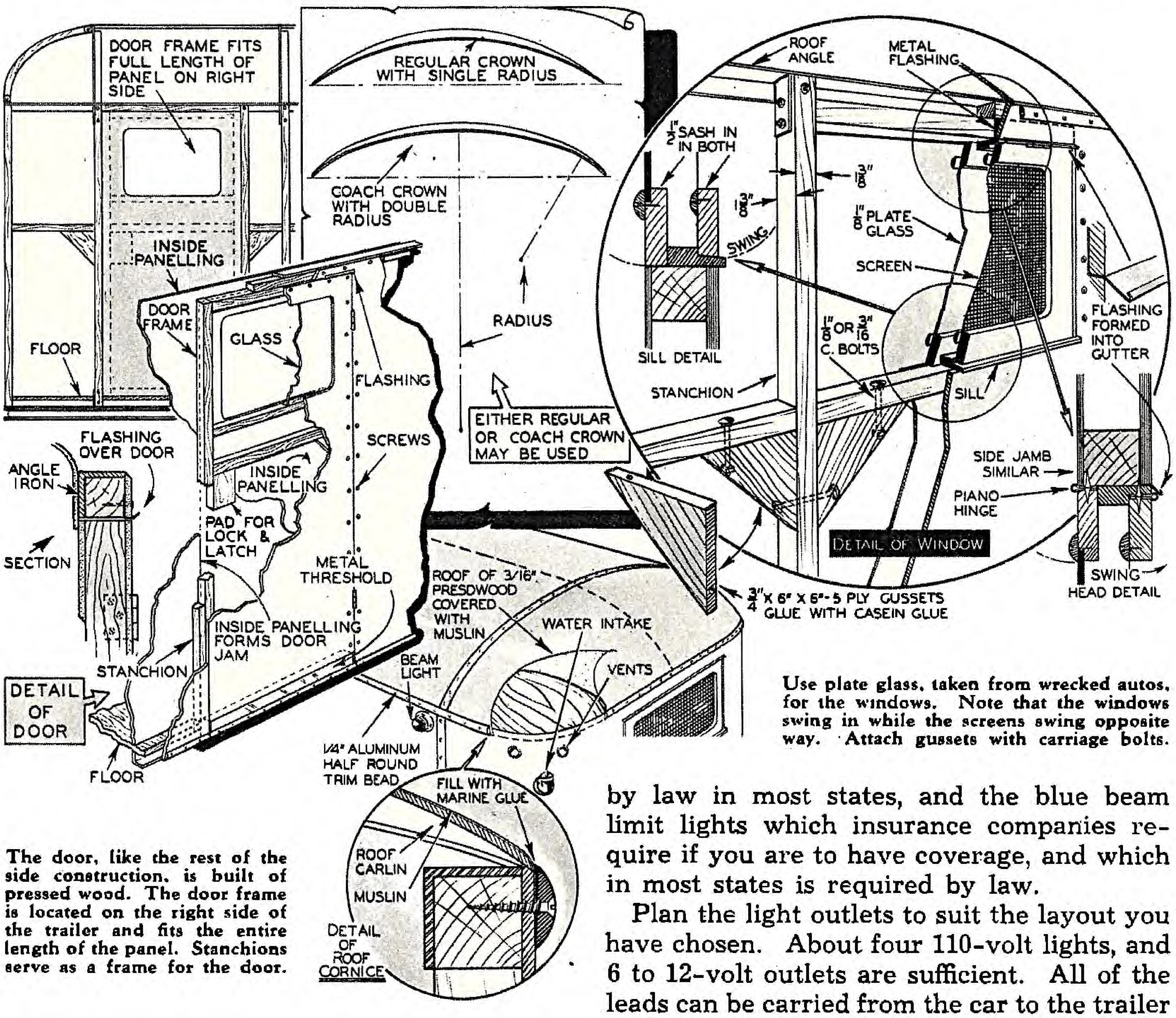
At left is shown manner in which floor and stanchions are mounted. At right—Method of attaching springs.

bolted using the C clamps to secure it while the bolting process goes on. Now install the other stanchions. Put in those with the clips, top and bottom, first. The extra, unclipped ones are for the window frames and are attached with single bolts transversely into the longitudinal face of the angle irons. At this stage of the game you will find your trailer in the same condition as a house frame with all the studding and plates installed.

Mount the middle body panel sills at the top and bottom of the windows. These are exactly 4′ from the top of the main chassis channel to the top of the sills. The ends butt flush to the stanchions, and are not let in. Plywood gusset plates are fastened with casein glue and bolt to both the stanchions and the sills, with the outer faces coming flush to the outside of the frame members to give backing to the panelling.

At this point the outer roof ceiling can be fastened on. It is made of $\frac{3}{16}$″ pressed wood sheet, cut in convenient panels and bolted with 1/8″ machine screws into the ridge and channel members. There will have to be occasional filler blocks placed in the angles for the wood to bear against. Under the forward crown of the ridge pole or center channel you will cut a 1/2″ by 1 1/4″ plywood carlin or former into which you can later

Door and Windows Offer New Safety Features


DOOR FRAME FITS FULL LENGTH OF PANEL ON RIGHT SIDE
INSIDE PANELLING
FLOOR
DOOR FRAME
GLASS
REGULAR CROWN WITH SINGLE RADIUS
COACH CROWN WITH DOUBLE RADIUS
RADIUS
FLASHING
SCREWS
EITHER REGULAR OR COACH CROWN MAY BE USED
FLASHING OVER DOOR
ANGLE IRON
SECTION
INSIDE PANELLING
PAD FOR LOCK & LATCH
METAL THRESHOLD
INSIDE PANELLING FORMS DOOR JAM
STANCHION
DETAIL OF DOOR
FLOOR
ROOF OF 3/16" PRESDWOOD COVERED WITH MUSLIN
BEAM LIGHT
WATER INTAKE
VENTS
1/4" ALUMINUM HALF ROUND TRIM BEAD
FILL WITH MARINE GLUE
ROOF CARLIN
MUSLIN
DETAIL OF ROOF CORNICE
ROOF ANGLE
METAL FLASHING
1/2" SASH IN IN BOTH
1 3/8"
1 3/8"
1/8" PLATE GLASS
SWING
SCREEN
1/8" OR 3/16" C. BOLTS
SILL DETAIL
STANCHION
SILL
FLASHING FORMED INTO GUTTER
SIDE JAMB SIMILAR
PIANO HINGE
DETAIL OF WINDOW
SWING
HEAD DETAIL
3/4" X 6" X 6"-5 PLY GUSSETS GLUE WITH CASEIN GLUE

Use plate glass, taken from wrecked autos, for the windows. Note that the windows swing in while the screens swing opposite way. Attach gussets with carriage bolts.

The door, like the rest of the side construction, is built of pressed wood. The door frame is located on the right side of the trailer and fits the entire length of the panel. Stanchions serve as a frame for the door.

fasten the inner ceiling at this point. The curved formers at the rear of the roof are, as the drawing shows, 3/4" by 1 3/4" carlins. These are fastened to the channel with 16 or 14-gauge clips, and bolted through. Use screws on the wooden members to fasten the pressed wood down, starting at the center ridge, and working the panels down to the edge.

After the outer portion of the roof is attached, wire up the trailer for lights. There should be three circuits; one for 110 volts for use in parks and in the rear of your home, where you may want to use the trailer as a spare bedroom. There should also be a set of wires for the smaller voltage lights which can be run from the car battery upon occasion, or from an independent generator set. The third set of wires connects directly from car to running lights, which consist of a red tail light with license plate, brake light, required by law in most states, and the blue beam limit lights which insurance companies require if you are to have coverage, and which in most states is required by law.

Plan the light outlets to suit the layout you have chosen. About four 110-volt lights, and 6 to 12-volt outlets are sufficient. All of the leads can be carried from the car to the trailer through a rubber covered cable about 1/2" diameter, with five or six colored wires imbedded; enough to carry whatever circuit you want.

Since no car battery can stand the strain of more than one overnight operation of trailer lighting requirements, a small A. C. generator, powered by the car's motor should be used.

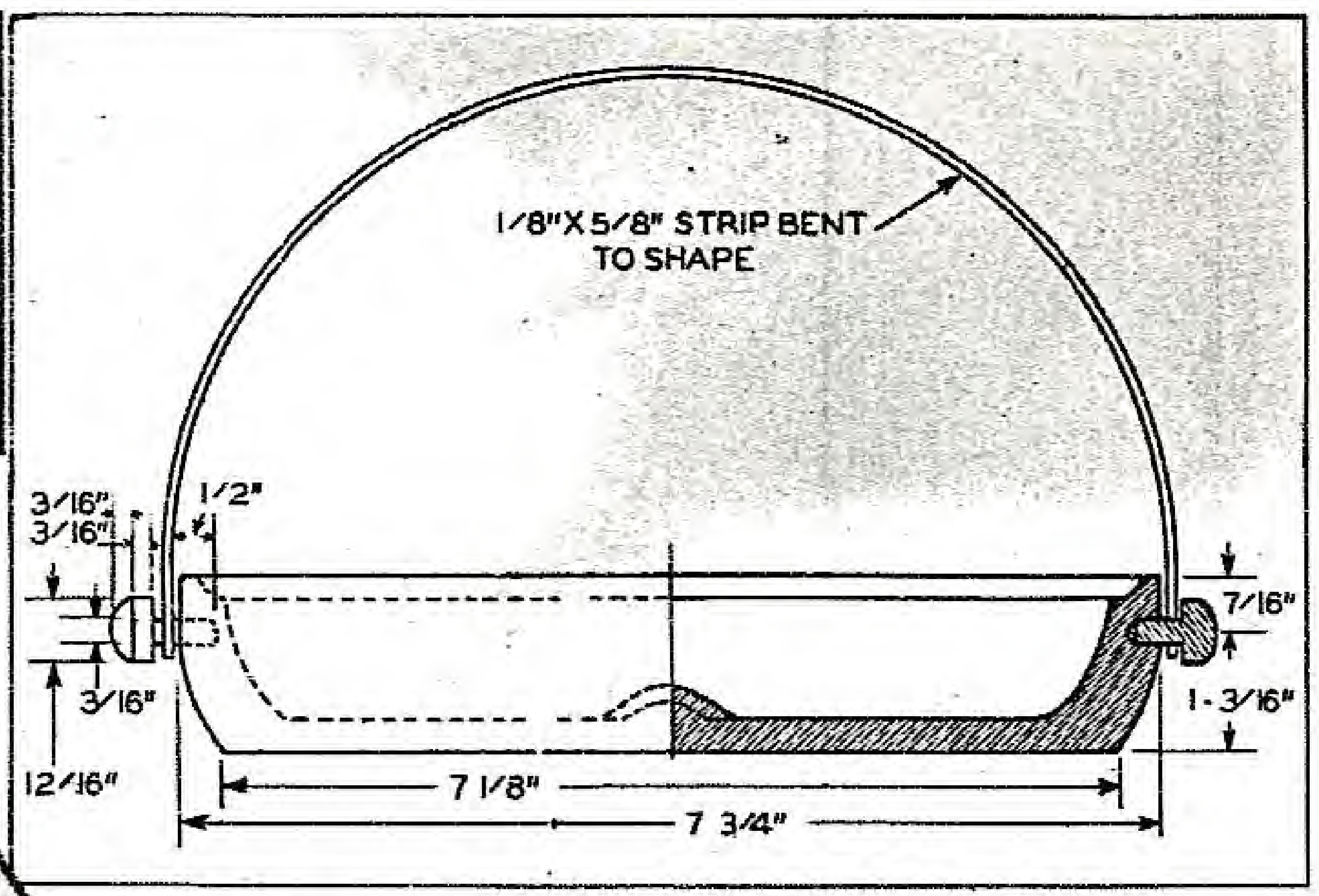
The pants for the wheels must be so fashioned that they will have about 1" clearance over the wheels when the spring is fully depressed.

A good form for dimensions is given in detail. They can be made up by any tinsmith out of 16 to 14-gauge metal, with rivets and soldered seam and bent up flanges for fastening.

The trailer floor is built of 5-ply 3/4" fir panels bolted through the filler blocks laid in the channel irons, with the heads counter-

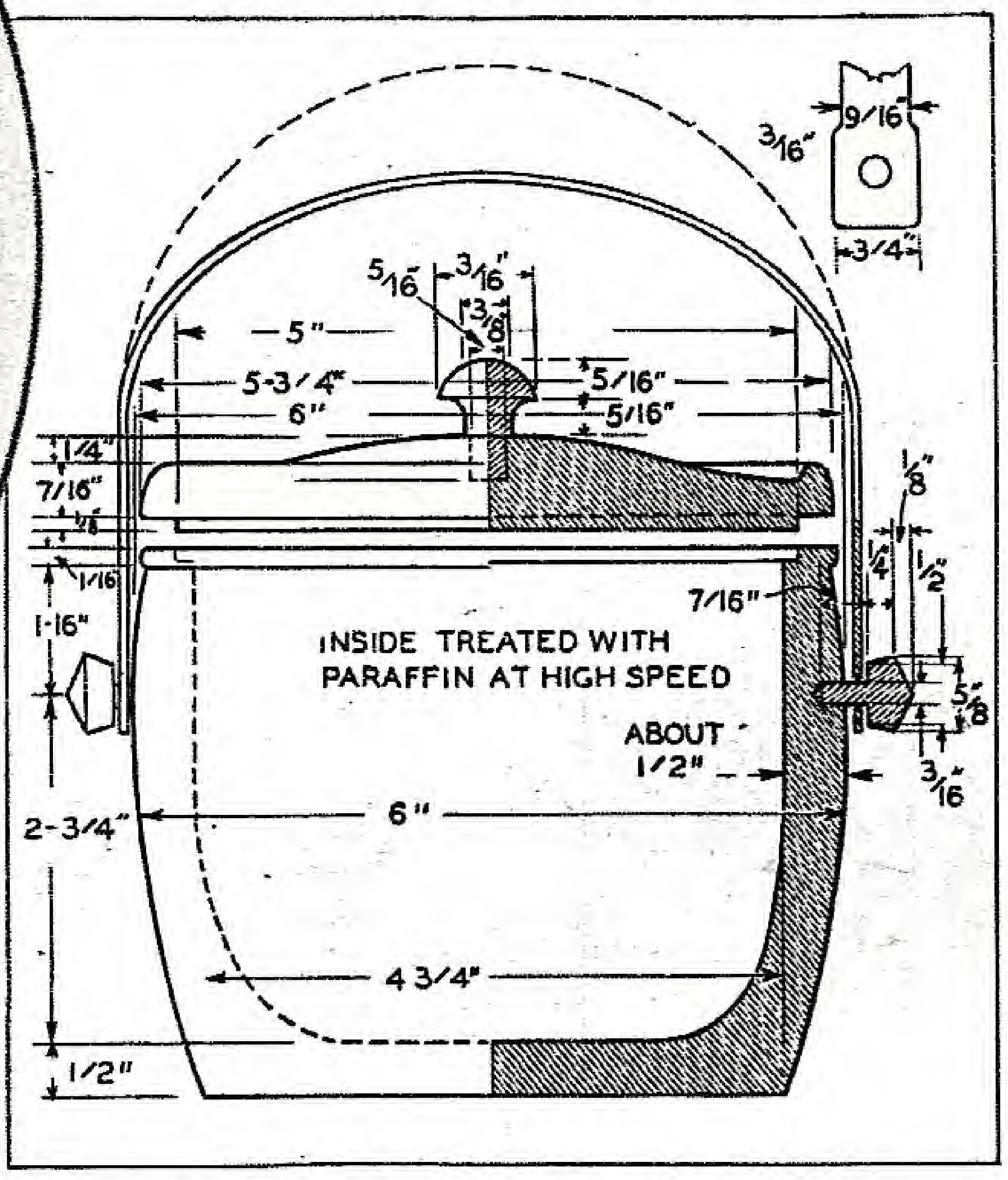
[*Continued on page* 124]

COOKIE JAR and CANDY TRAY SIMPLE HOME LATHE PROJECTS

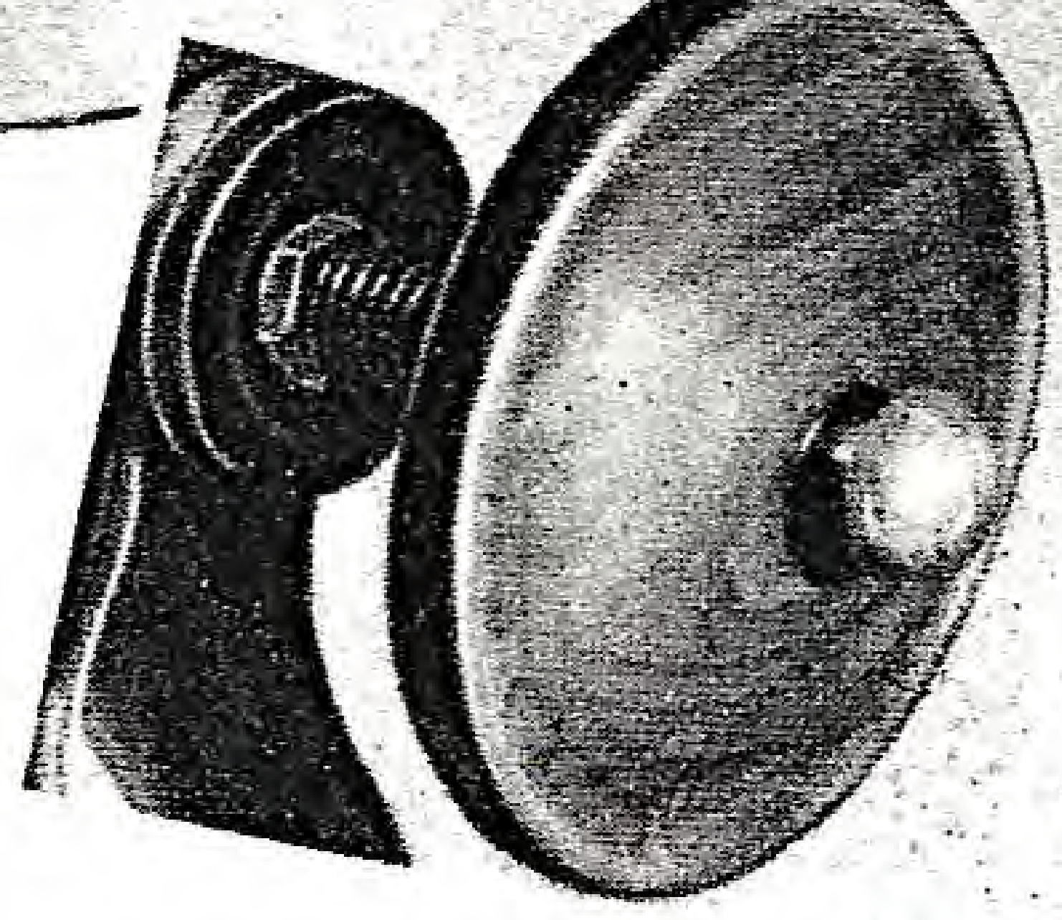


Above are given the dimensions of the candy tray as taken from a cross section view. Walnut can be used in making this project.

Extremely simple to construct on the workshop lathe, this cookie jar and candy tray take on the appearance of being difficult projects. Either of these may be constructed in one evening.



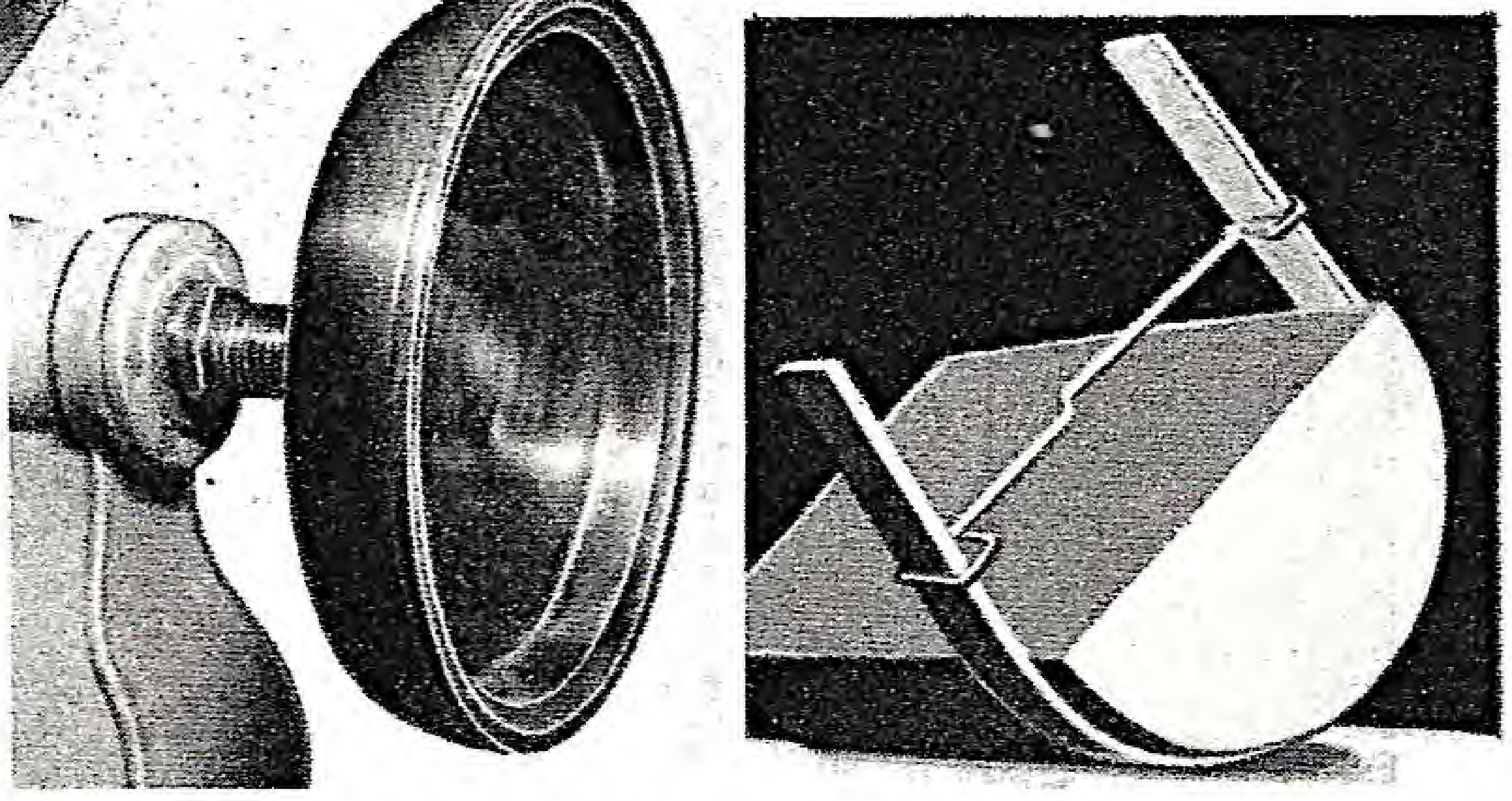
Turn the cookie jar and lid according to the above plan using either figured or red gum.



HERE are two projects, each calling for about one evening after dinner. Ideal because of their simplicity, they are good projects in design and show how the simple addition of bent handles double their attractiveness and value.

The cookie jar was turned from a glued up block of figured or red gum 4½ inches high and 5¾ inches square. Right here, however, let it be said that the size can readily be increased to 7 inches in height and 9½ or 10 inches for a full-utility container if desired. This size shown is about right for dutch lunches and late snacks, holding a nice quantity of crackers or tidbits.

The medium size face plate with three screws was used, the outside being turned first, then the inside turned to the shape shown with a wall thickness averaging about ½ inch. With so much wood to be cut away, shrinkage naturally develops, therefore roughly turn outside and inside, then after the wood reshapes itself, the final cut can be made.



Here are shown various stages in the jar and tray construction as well as the forming of the handle. Drilling holes, for the pins, in the handle before bending to shape simplifies the work.

For the finish cuts, both inside and outside, very thin layers of wood should be removed, to decrease the amount of sanding necessary. Sanding until a perfect surface results is essential for a satisfactory job. This cookie jar is of gum. If walnut is used the wood should be filled before applying a coat of lacquer. No filler or lacquer is used on the inside. This also applies to the under side of the lid. In-

[*Continued on page* 126]

IMPROVING *the* GARDEN *with*

THE most ordinary of backyards can be vastly improved in appearance and comfort simply by the introduction of garden furniture and a few well-placed trellises to serve as screens. From the suggestions given here any home-owner can very easily build his own lawn decorations, altering them if necessary to suit individual needs.

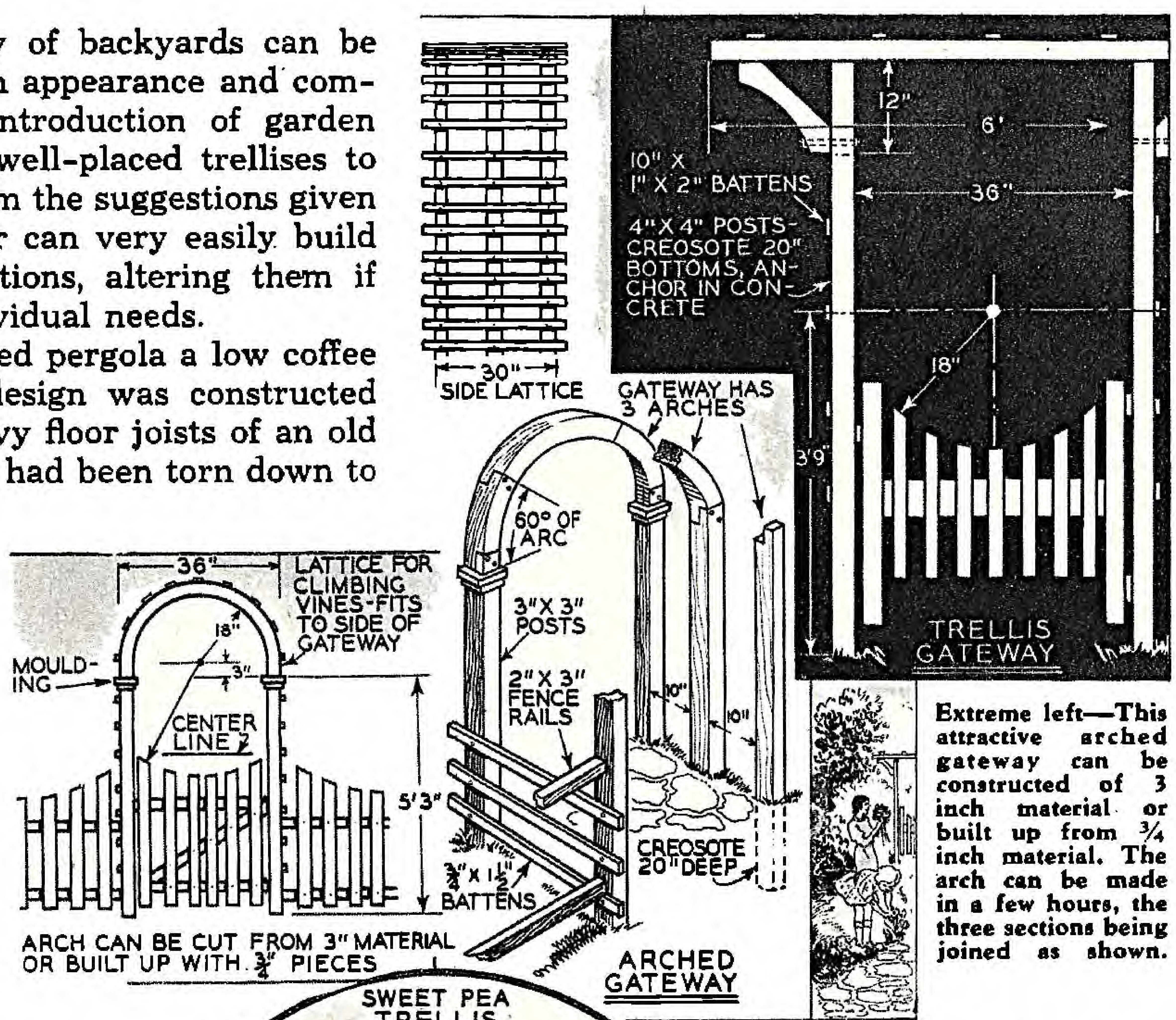
For use in the shaded pergola a low coffee table of interesting design was constructed entirely from the heavy floor joists of an old school building which had been torn down to make way for new structures. Anyone can easily duplicate this in unsurfaced 2-inch planks, which can be adzed or roughly shaped with a sharp hatchet to take off the sharp edges and give them a hand-hewn effect. Its extreme simplicity of construction, as illustrated in the perspective drawing, gives it a rugged charm.

A chair can be built to go with the coffee-table if desired. Easily moved about on the two wooden wheels, the chair has an adjustable back for the comfort of the "passenger." To give the proper impression of age it, too, should be roughened and the workmanship should be more or less crude.

The pioneer settee is another interesting project that is suitable for terrace, verandah or patio. In all of the foregoing pieces lag screws are used in construction and these should be galvanized or thoroughly painted. By doing so, the furniture will last for several generations.

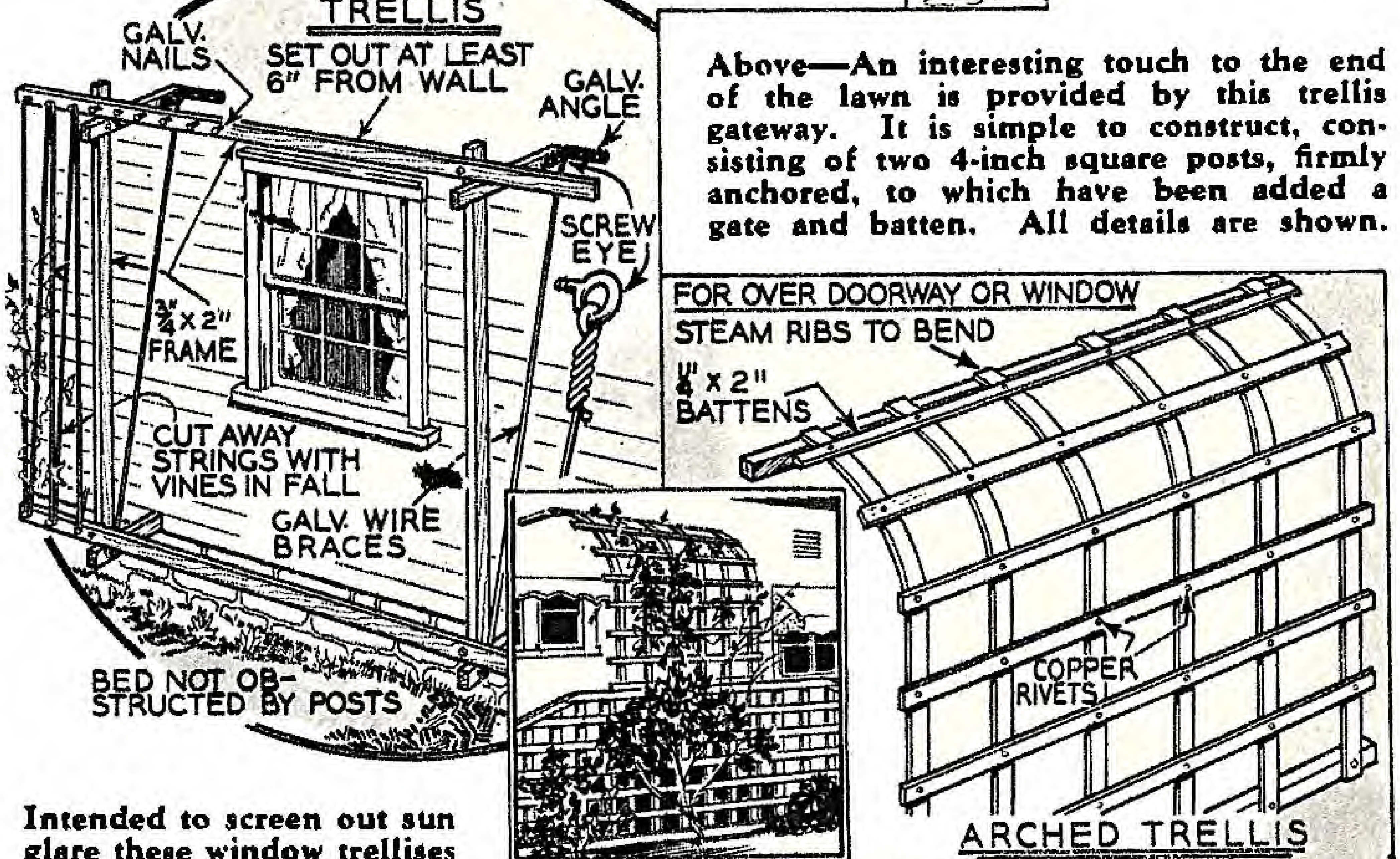
The novel Barrow Seat lends an interesting touch to any garden. Its construction requires only the simplest kind of carpentry. The curved seat-back can be cut with a coping saw if a scroll or jig saw is not available.

Make the wheel of 1-inch or thicker pine, with ¾-inch cleats. The latter should not be cut with geometrical precision; a rough job throughout seems to fit in with a garden

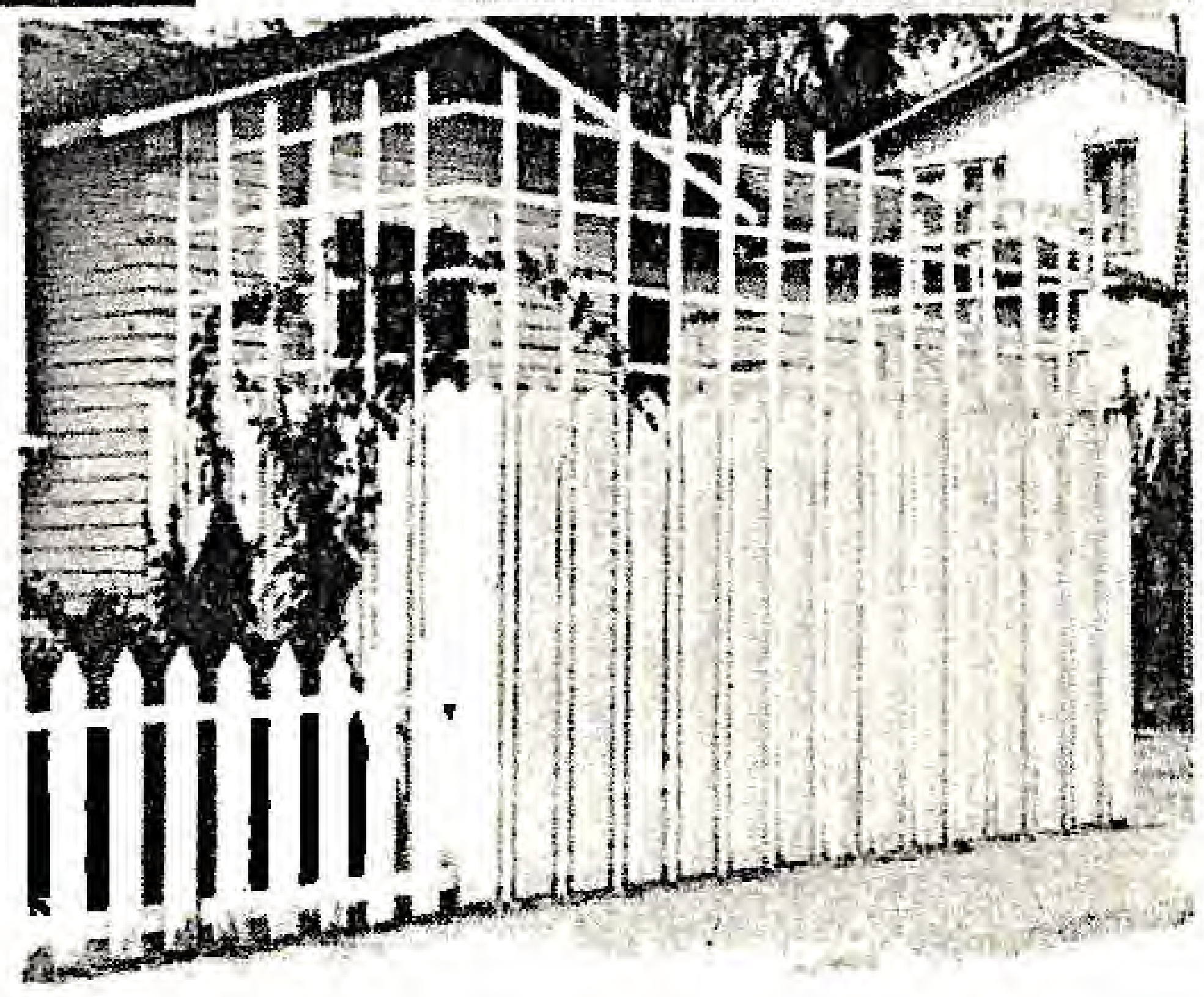

30"
SIDE LATTICE
10" X
1" X 2" BATTENS
4"X 4" POSTS-CREOSOTE 20" BOTTOMS, ANCHOR IN CONCRETE
12"
6'
36"
18"
3'9"
TRELLIS GATEWAY
GATEWAY HAS 3 ARCHES
60° OF ARC
3"X 3" POSTS
2"X 3" FENCE RAILS
10"
10"
CREOSOTE 20" DEEP
¾"X 1½" BATTENS
ARCHED GATEWAY
36"
LATTICE FOR CLIMBING VINES-FITS TO SIDE OF GATEWAY
18"
3"
MOULDING
CENTER LINE
5'3"
ARCH CAN BE CUT FROM 3" MATERIAL OR BUILT UP WITH ¾" PIECES

Extreme left—This attractive arched gateway can be constructed of 3 inch material or built up from ¾ inch material. The arch can be made in a few hours, the three sections being joined as shown.

Above—An interesting touch to the end of the lawn is provided by this trellis gateway. It is simple to construct, consisting of two 4-inch square posts, firmly anchored, to which have been added a gate and batten. All details are shown.


SWEET PEA TRELLIS
GALV. NAILS
SET OUT AT LEAST 6" FROM WALL
GALV. ANGLE
SCREW EYE
¾"x2" FRAME
CUT AWAY STRINGS WITH VINES IN FALL
GALV. WIRE BRACES
BED NOT OBSTRUCTED BY POSTS
FOR OVER DOORWAY OR WINDOW
STEAM RIBS TO BEND
¼"x 2" BATTENS
COPPER RIVETS
ARCHED TRELLIS

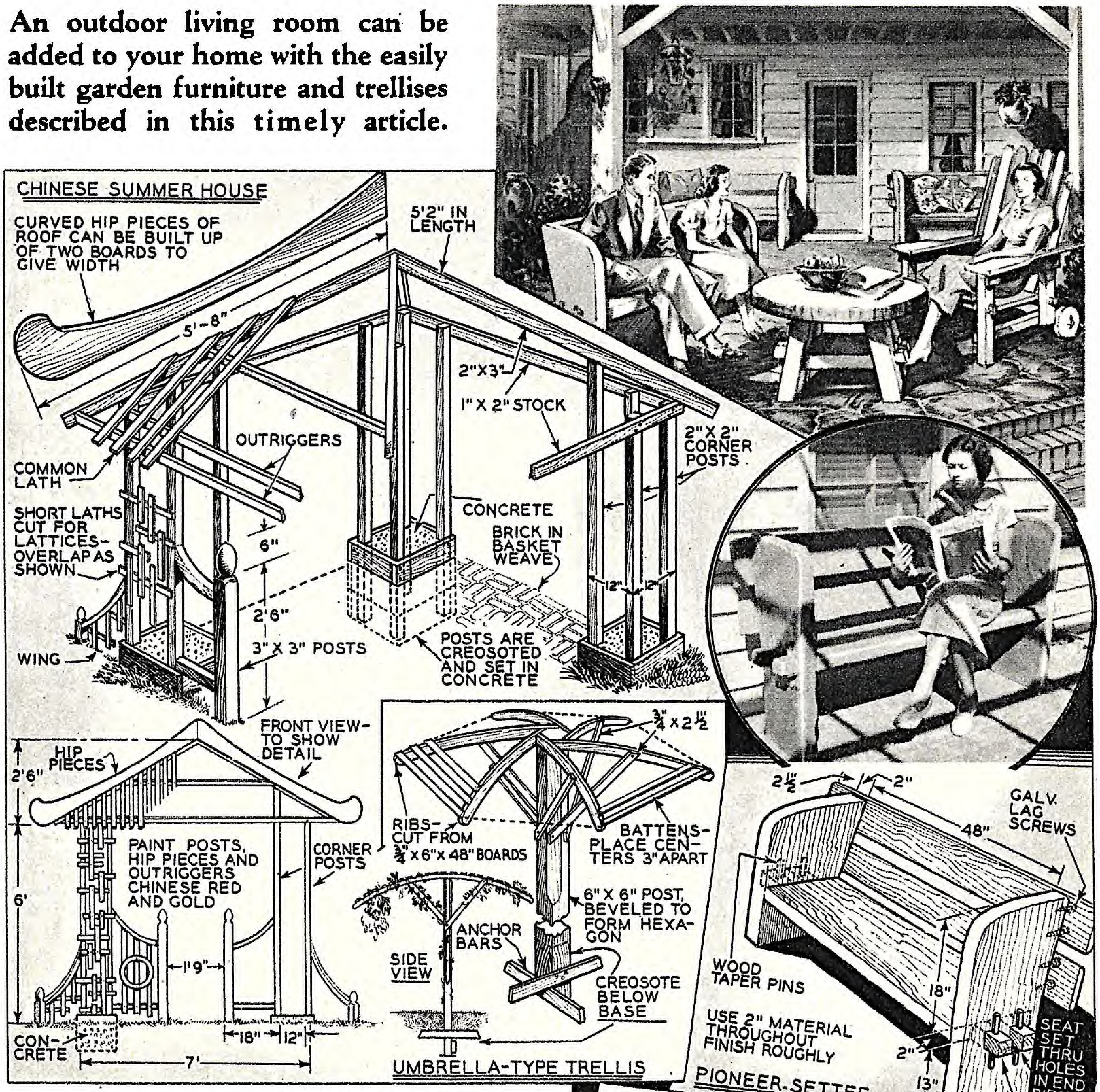
Intended to screen out sun glare these window trellises provide a living curtain throughout summer months. The builder has his choice of curved or string type trellis as shown. String type is especially suited for sweet peas and similar vines.



The odd corners of your house or garden will provide a delightful spot for this combination picket fence and trellis.

OUTDOOR FURNITURE *by* HI SIBLEY

An outdoor living room can be added to your home with the easily built garden furniture and trellises described in this timely article.


CHINESE SUMMER HOUSE
CURVED HIP PIECES OF ROOF CAN BE BUILT UP OF TWO BOARDS TO GIVE WIDTH
5'-8"
5'2" IN LENGTH
2"X3"
1"X 2" STOCK
2"X 2" CORNER POSTS
OUTRIGGERS
COMMON LATH
SHORT LATHS CUT FOR LATTICES-OVERLAP AS SHOWN
6"
CONCRETE
BRICK IN BASKET WEAVE
12"
12"
2'6"
3"X 3" POSTS
WING
POSTS ARE CREOSOTED AND SET IN CONCRETE
FRONT VIEW-TO SHOW DETAIL
HIP PIECES
2'6"
6'
PAINT POSTS, HIP PIECES AND OUTRIGGERS CHINESE RED AND GOLD
CORNER POSTS
1'9"
18"
12"
CON-CRETE
7'
3/4"x2 1/2
RIBS-CUT FROM 3/4"x6"x48" BOARDS
BATTENS-PLACE CENTERS 3" APART
6"X 6" POST, BEVELED TO FORM HEXAGON
ANCHOR BARS
SIDE VIEW
CREOSOTE BELOW BASE
UMBRELLA-TYPE TRELLIS
2 1/2"
2"
48"
GALV. LAG SCREWS
WOOD TAPER PINS
USE 2" MATERIAL THROUGHOUT FINISH ROUGHLY
18"
2"
13"
SEAT SET THRU HOLES IN END PIECES PINNED
PIONEER-SETTEE

The Pioneer Settee described above is simple to build since its construction is intended to be rough. The seat is attached to the end pieces with tapered wooden pins giving it a true pioneer appearance. Attach the two back pieces to the rest of the settee with large galvanized wood screws. Construct the entire project from two inch unfinished stock.

For serving afternoon tea outdoors a Chinese summer house is just the thing. While slightly more expensive than some of the other projects it is well worth the investment. Involving only simple construction work the summer house should not require more than one day to build. It may be finished off by trimming the hip pieces, gate posts and outriggers in bright Chinese red paint spotted with gold.

• • •

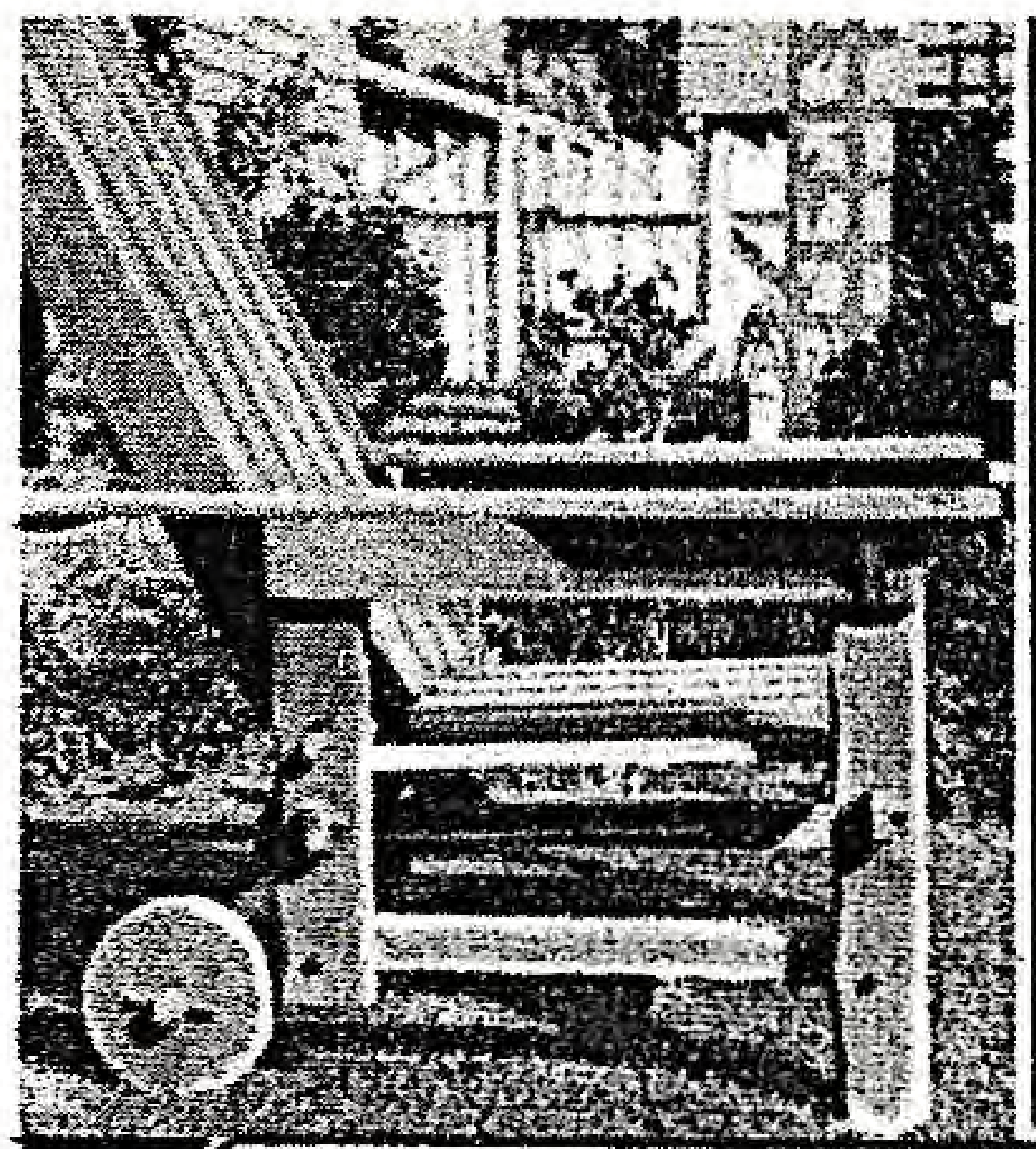
The Umbrella-Type trellis, shown at the right, will do much to add charm to a barren spot in the backyard lawn. Only one upright post is required to support it; the vines clinging to the umbrella-like ribs attached to the post. To prevent the post from rotting paint with asphalt compound or creosote.

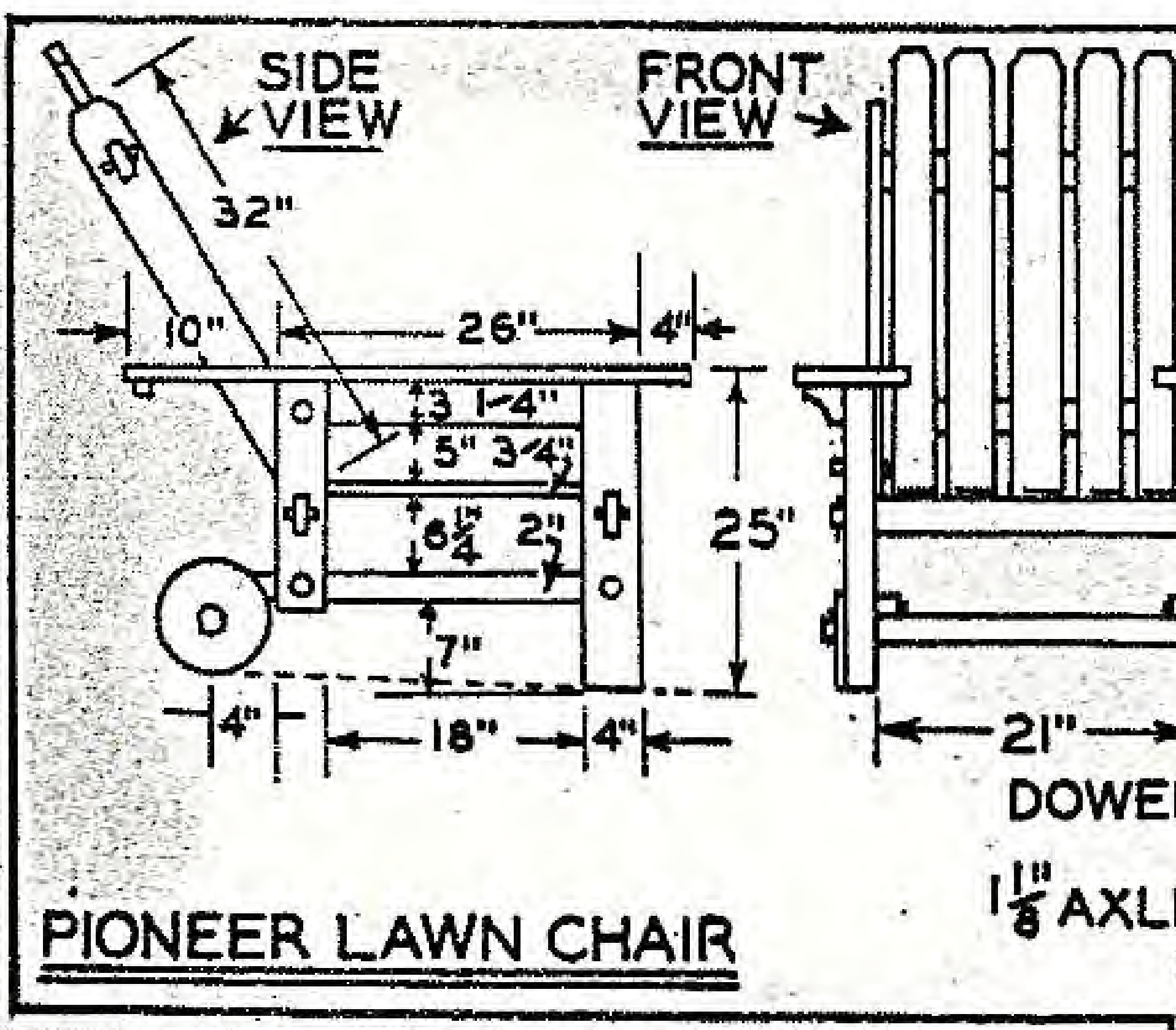
setting. The wheel is not intended to turn as the barrow is a stationary fixture. A piece of pipe or pitchfork handle serves as the axle.

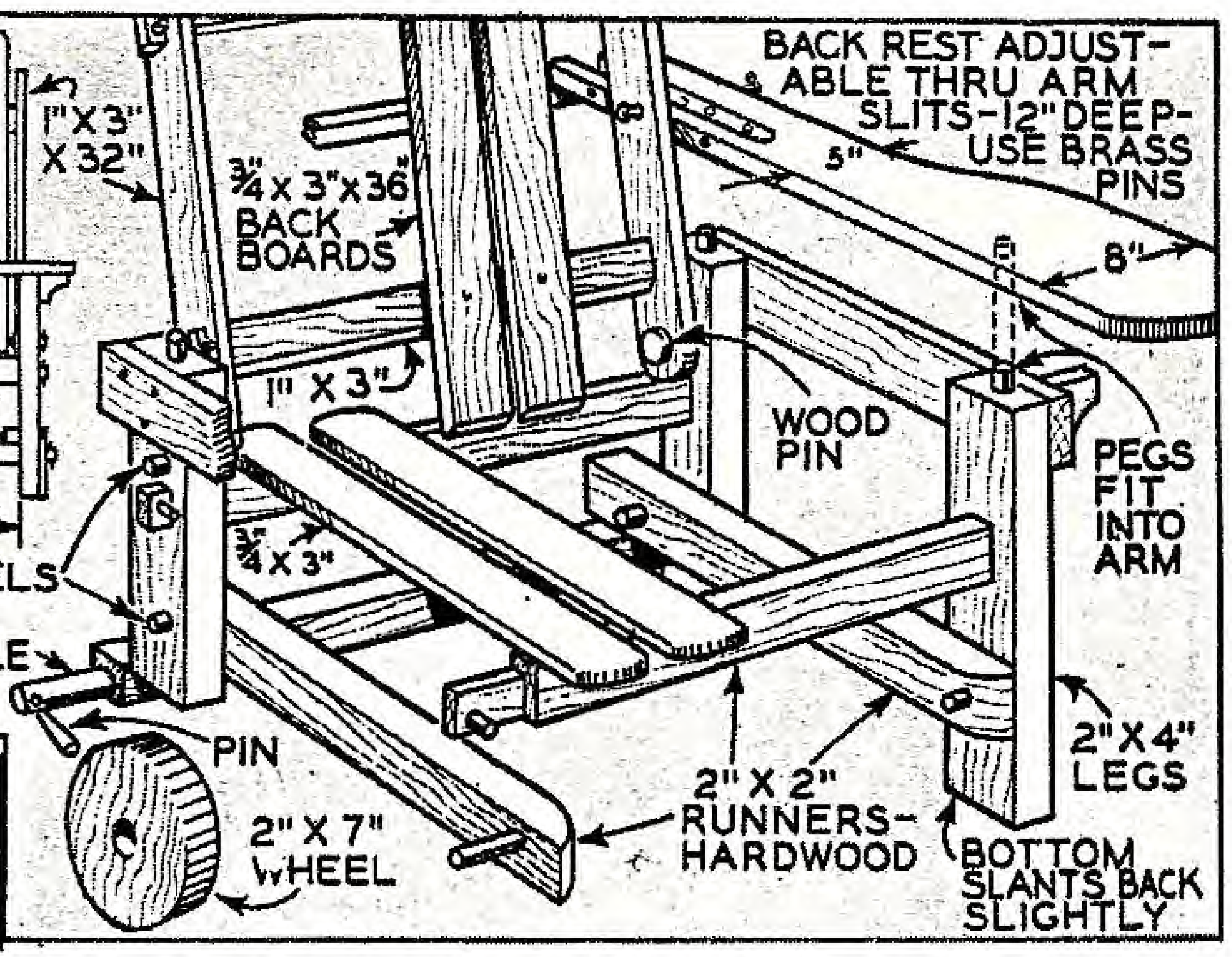
Build the flooring directly upon the two two-by-two sills and erect the seat back and flower box upon it. Bore a few ¼-inch holes in the bottom of the flower box and coat the inside with tar paint to prevent rot. Reinforce the corners with triangular cleats as shown. Finish with a coat of white paint.

Trellises also add much to the beauty of a home's surroundings. An unusually inviting arched gateway can be built up of ¾-inch scroll-sawed segments screwed together.

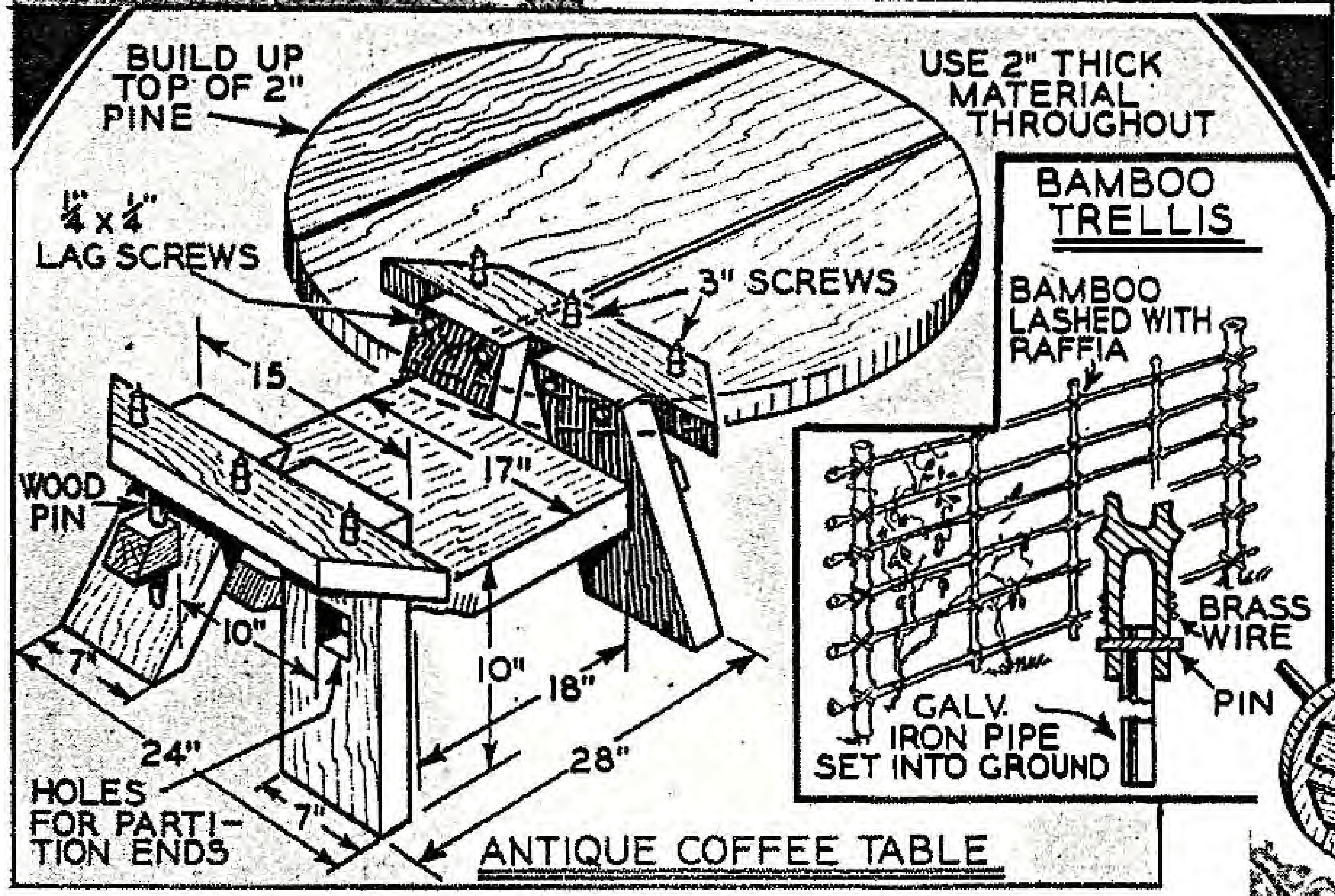
LAWN FURNITURE ADDS BEAUTY TO ANY HOME




SIDE VIEW
32"
10"
26"
4"
3 1-4"
5" 3-4"
6¼
2"
7"
25"
4"
18"
4"
FRONT VIEW
21"
PIONEER LAWN CHAIR


1"X3" X32"
¾x3"x36" BACK BOARDS
BACK REST ADJUSTABLE THRU ARM SLITS-12" DEEP-USE BRASS PINS
5"
8"
1" X 3"
WOOD PIN
PEGS FIT INTO ARM
¾x3"
DOWELS
1⅛" AXLE
PIN
2"X7" WHEEL
2"X2" RUNNERS-HARDWOOD
2"X4" LEGS
BOTTOM SLANTS BACK SLIGHTLY

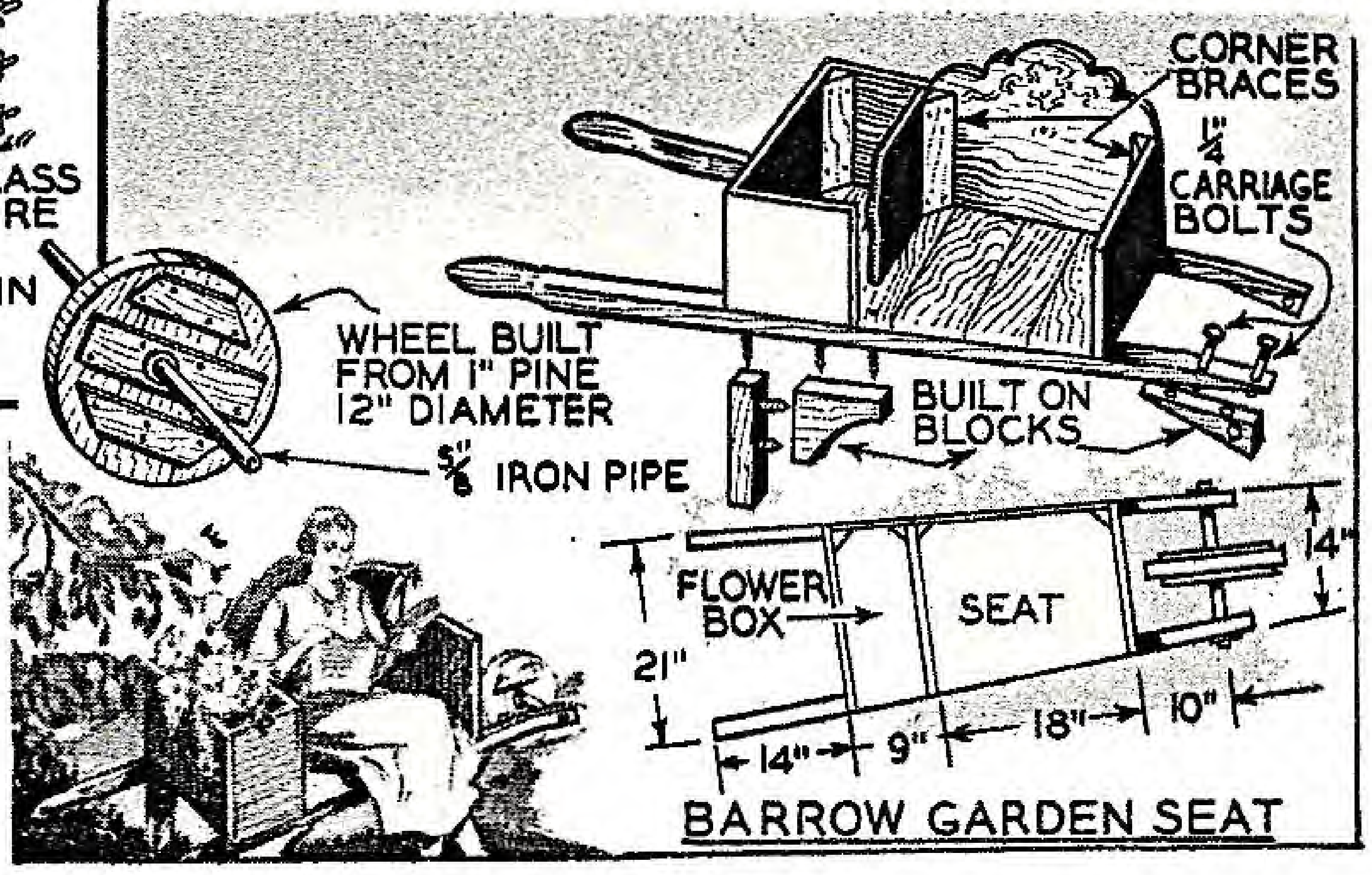
Provided with two small wooden wheels the Pioneer lawn chair permits easy transportation to any part of the lawn. The chair should be assembled wherever possible with dowels so as to keep the early atmosphere in evidence. To simplify construction all necessary dimensions are given on each diagram.


BUILD UP TOP OF 2" PINE
USE 2" THICK MATERIAL THROUGHOUT
¼"x¼" LAG SCREWS
3" SCREWS
15
17"
WOOD PIN
10"
7"
24"
10"
18"
28"
7"
HOLES FOR PARTITION ENDS
ANTIQUE COFFEE TABLE
BAMBOO TRELLIS
BAMBOO LASHED WITH RAFFIA
BRASS WIRE
PIN
GALV. IRON PIPE SET INTO GROUND

Designed for use in either a summer house or pergola this Antique Coffee Table is constructed much in the same manner as the settee. Old timber secured from a house wrecking firm is ideal for the project. Two inch stock is used throughout with pins and large wood screws to hold the table together.

• • •

Another trellis is shown in the inset. This is constructed of bamboo and held rigid by iron pipes sunk in the ground.


CORNER BRACES
¼" CARRIAGE BOLTS
WHEEL BUILT FROM 1" PINE 12" DIAMETER
⅝ IRON PIPE
BUILT ON BLOCKS
FLOWER BOX
SEAT
21"
14"
14"
9"
18"
10"
BARROW GARDEN SEAT

The Barrow Garden Seat is an interesting novelty for any man's garden. This one can be constructed in the home shop from odds and ends. A flower box attached to the end adds to the barrow's beauty especially when filled with bright colored blossoms. In cutting out the wheel it is not necessary that it be round. Forming it roughly will add to originality.

Near the top the posts are set off with mouldings in the form of simple capitals. Battens along the sides afford a "toehold" for climbing vines.

For an exposed doorway or too-sunny window, a graceful arched trellis is easily made. The curved members are wide battens which having first been boiled or soaked in water then bent over a form and allowed to set for a day or so. Fasten the trellis together with copper rivets.

Although extremely simple the sweet pea trellis is excellent for in front of a sunny window. Cotton strings are used instead of wire, for the vines to climb upon.

To break up an open space, or provide a natural sunshade at the end of the lawn, the umbrella-type trellis is highly recommended, and for purposes of copying has been designed so that the average man will be able to build it. Some band or scroll-saw work is required on the ribs, but otherwise it is simple carpentry all the way through.

In localities where bamboo is available, some splendid effects can be achieved by binding the poles together with raffia. The poles should not be pushed into the ground, however, because of decay. An iron pipe will better serve the purpose.

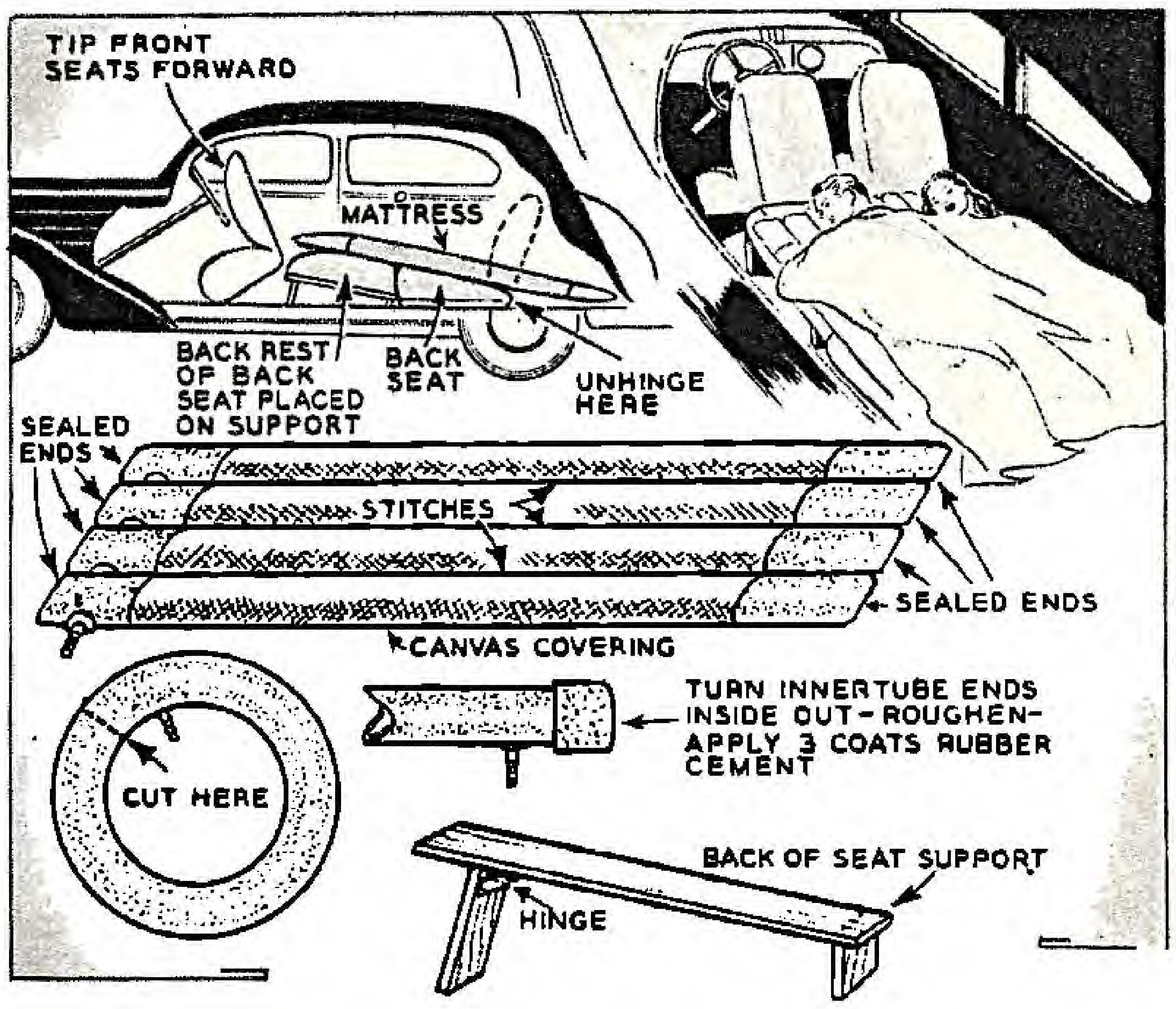
For the more ambitious home craftsman, the Chinese summer house makes an interesting feature for the garden as well as a cool retreat in hot weather. The cutaway drawing gives details of construction. Galvanized nails should be used for long life. The curved hip pieces for the roof can be built up of two boards to give the necessary width.

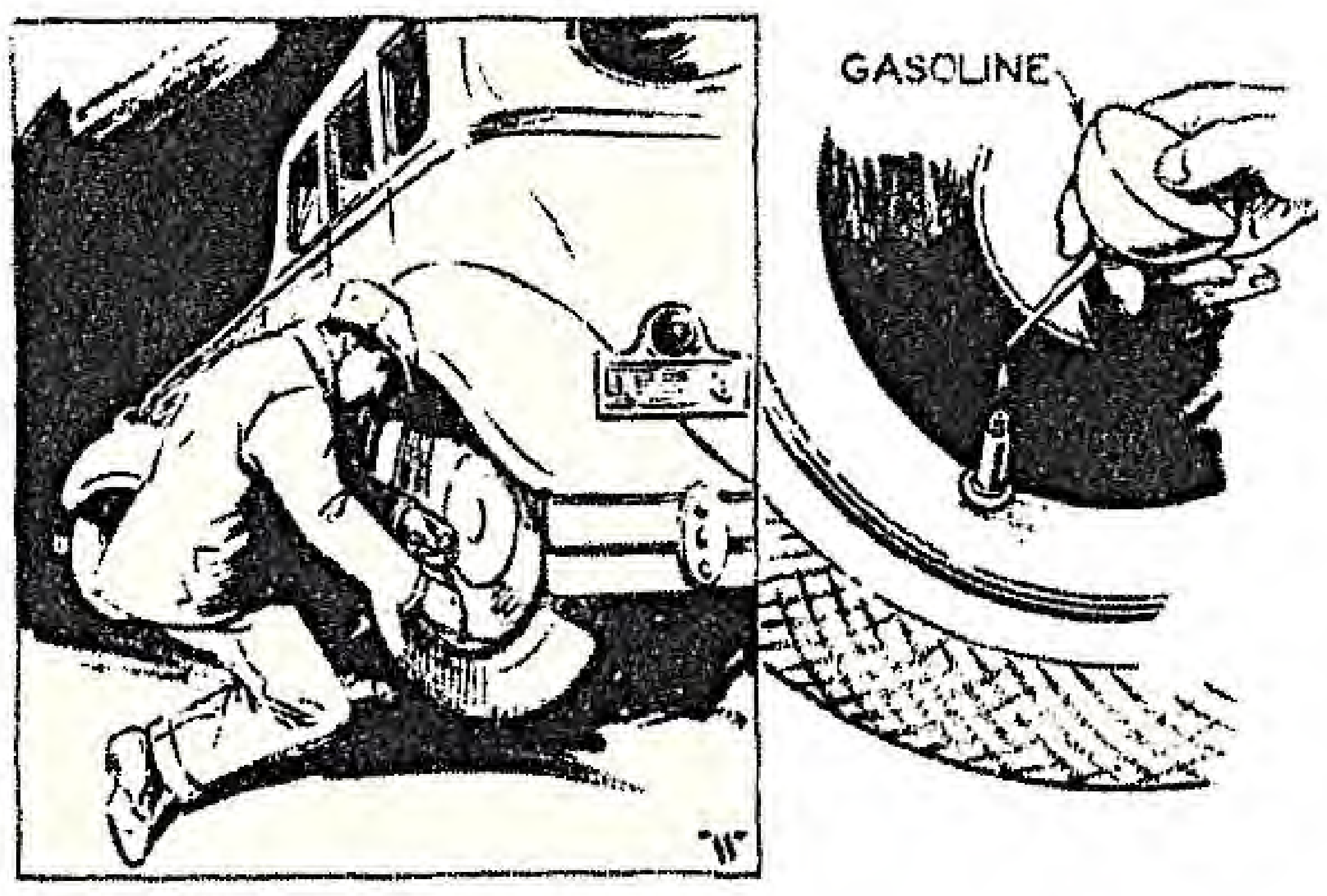
Before anchoring the corner posts either in concrete or earth they should be thoroughly creosoted below the surface. The trellis-house can be enhanced by giving it a touch of Chinese red and gold on the hip-pieces, the gate posts and the outriggers. Bright red urns may be set within the group of four corner posts, and filled with brightly colored blooming plants of your own selection.

Summer Suggestions for Modern Motorists

Folding Seat Forms Auto Bed

WHERE the pocketbook does not permit the use of a trailer the summer tourist will find this simple auto bed the ideal thing for traveling. Intended for use in 1935 and 1936 model Fords provided with a folding rear seat the bed consists of lengths of inner tube sealed at the ends and formed into an air mattress as described in the illustration. The back rest is placed on a simple wooden support and the mattress then placed on top. The streamlined design of the car allows for sufficient foot room. When not in use the bed may be stored in the tool compartment by deflating the mattress.—L. W. Edgerton.


TIP FRONT SEATS FORWARD
MATTRESS
BACK REST OF BACK SEAT PLACED ON SUPPORT
BACK SEAT
UNHINGE HERE
SEALED ENDS
STITCHES
SEALED ENDS
CANVAS COVERING
TURN INNERTUBE ENDS INSIDE OUT-ROUGHEN-APPLY 3 COATS RUBBER CEMENT
CUT HERE
BACK OF SEAT SUPPORT
HINGE

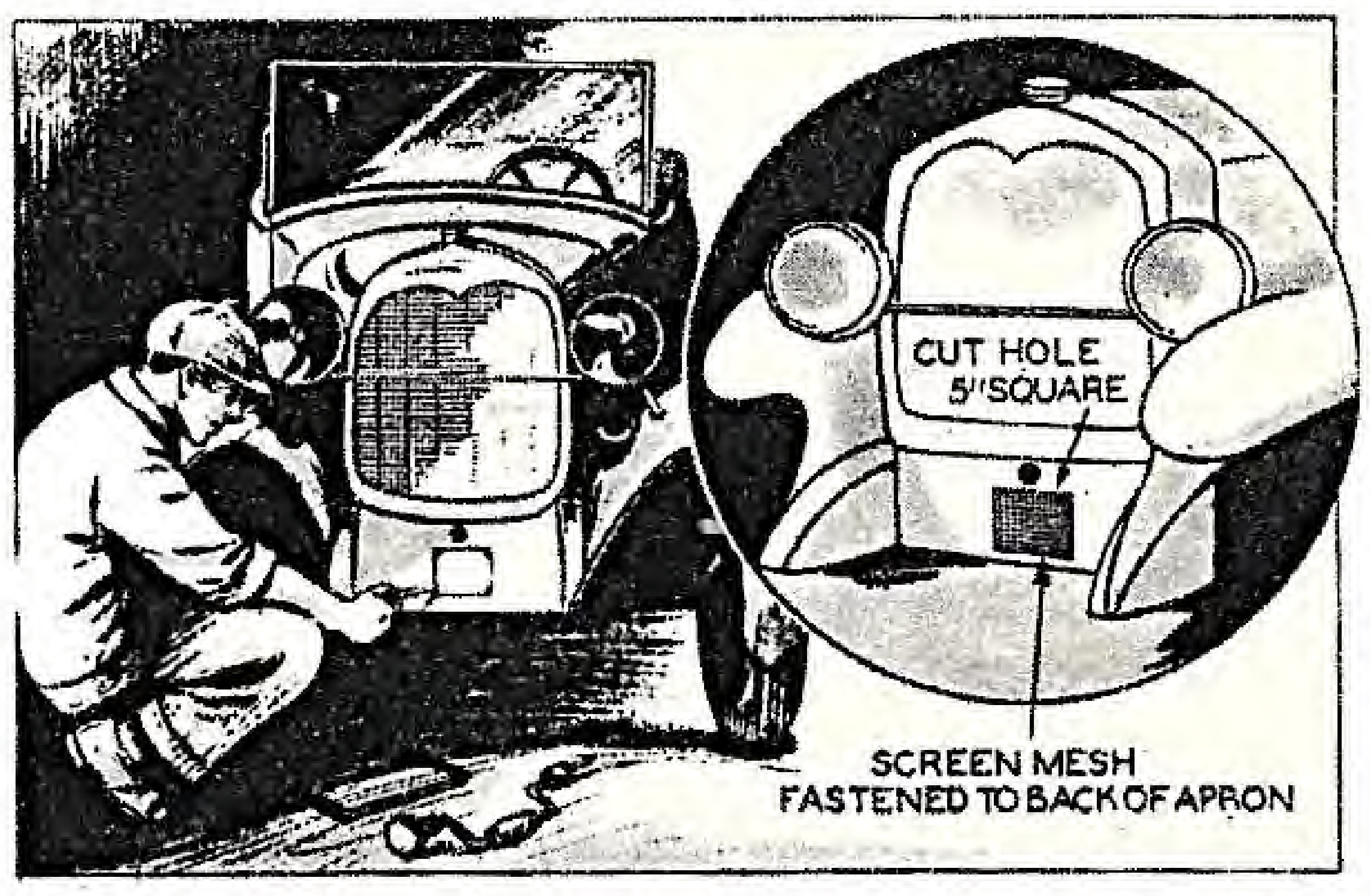


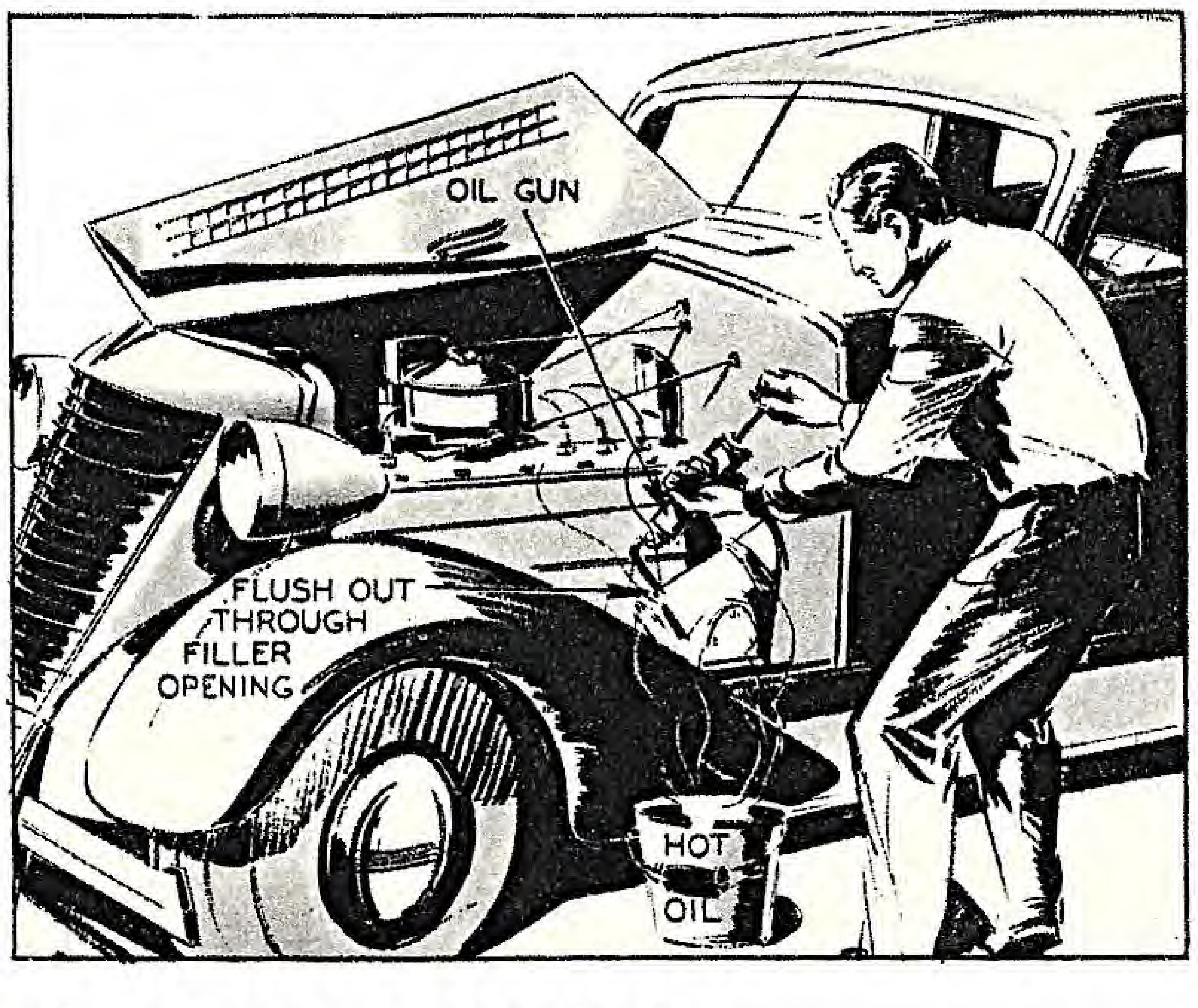
Gasoline Stops Leaking Inner Tube Valve

WHEN an inner tube valve leaks and it is impossible to procure another at the time, a few drops of gasoline in the valve step will usually correct the trouble. The gasoline when put into the valve softens the rubber sealing washer of the valve core causing it to swell and in a few moments effectively seals the leak. The repair will last until a new stem can be installed.—E. J. Novak.

Opening In Splash Apron Cools Hot Engines

WHEN driving a car at high speeds in warm weather for any length of time the oil in the crank case thins out to such an extent that damage to the engine is sure to result. To overcome this danger cut an opening in the splash apron six by five inches and insert a piece of copper screening of fine mesh. This will permit air to circulate around the engine, cooling the oil sufficiently.—J. Emil.


CUT HOLE 5"SQUARE
SCREEN MESH FASTENED TO BACK OF APRON


OIL GUN
FLUSH OUT THROUGH FILLER OPENING
HOT OIL

Hot Oil Cleans Out Gear Housing

SINCE very few cars are provided with drain plugs on the steering gear housing they never receive the necessary flushing until some part is damaged and the housing has to be taken apart for repairs. This trouble and expense for new parts is very often caused by lack of the required flushing which would have prevented the parts from wearing.

Any motorist can flush out this housing even though it is not provided with a drain plug. Fill a grease gun with hot cylinder oil and force the oil into the housing through the filler hole.—J. E. Kavon.

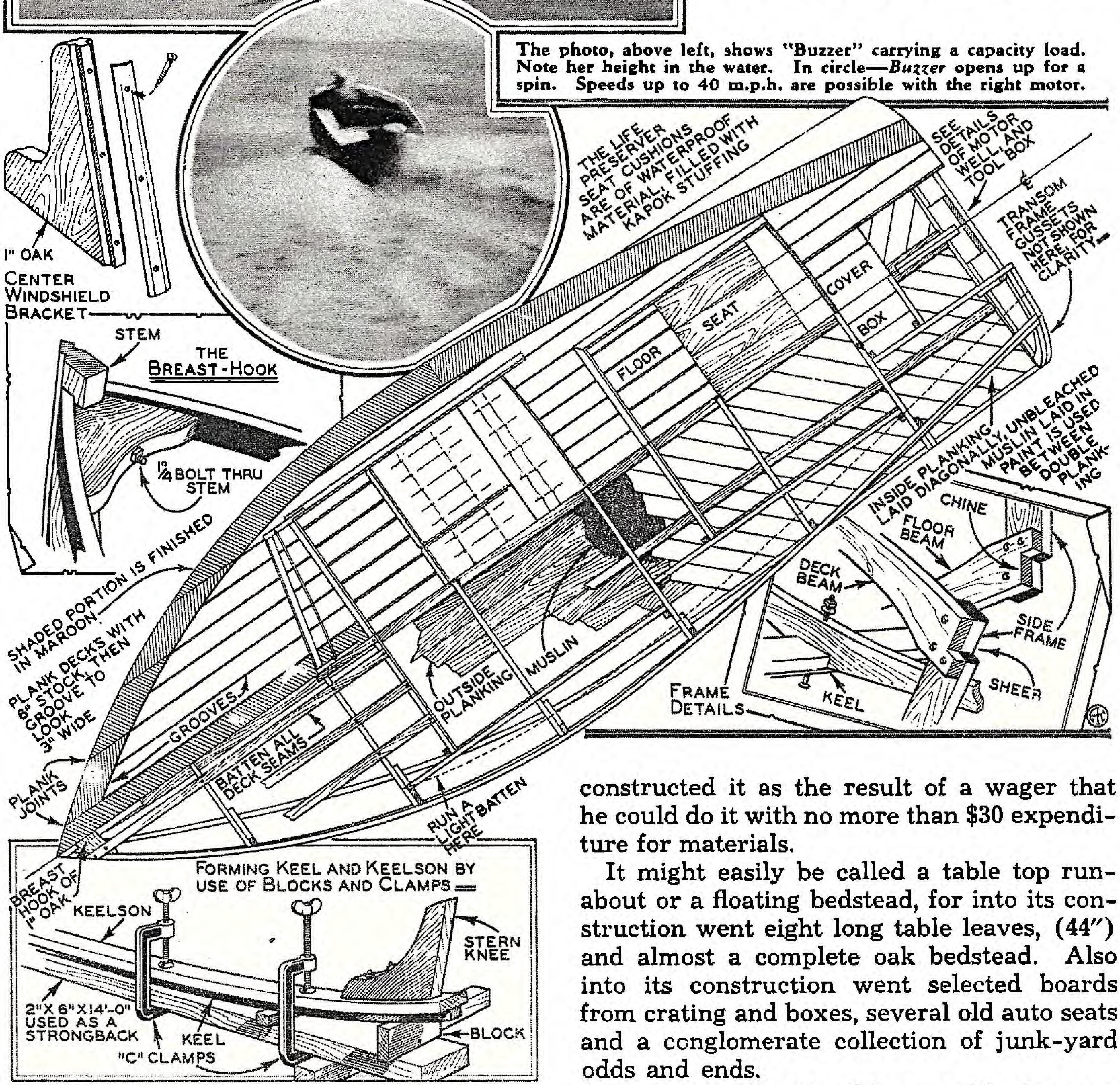
PLANS FOR "BUZZER"

CLIPPING over the water at a rate of 44 miles per hour in a seaworthy runabout built by yourself at a total cost of $30 is thrilling fun. There is not only the thrill resulting from speed, but also the pride of ownership—the pride of having constructed a boat that in its class is second to none—and the pride of having done so with a minimum of expense.

The minimum of expense in this case is low; the boat is Buzzer; the designer and builder constructed it as the result of a wager that he could do it with no more than $30 expenditure for materials.

It might easily be called a table top runabout or a floating bedstead, for into its construction went eight long table leaves, (44") and almost a complete oak bedstead. Also into its construction went selected boards from crating and boxes, several old auto seats and a conglomerate collection of junk-yard odds and ends.

Professional boat builders would, of course, scoff at the waste of time involved in collect-



The photo, above left, shows "Buzzer" carrying a capacity load. Note her height in the water. In circle—*Buzzer* opens up for a spin. Speeds up to 40 m.p.h. are possible with the right motor.

1" OAK
CENTER WINDSHIELD BRACKET
STEM
THE BREAST-HOOK
1¼ BOLT THRU STEM
THE LIFE PRESERVER SEAT CUSHIONS ARE OF WATERPROOF MATERIAL, FILLED WITH KAPOK STUFFING
SEE DETAILS OF MOTOR WELL AND TOOL BOX
℄
TRANSOM FRAME GUSSETS NOT SHOWN HERE, FOR CLARITY
COVER
BOX
SEAT
FLOOR
INSIDE PLANKING, LAID DIAGONALLY, UNBLEACHED MUSLIN LAID IN PAINT IS USED BETWEEN DOUBLE PLANKING
CHINE
FLOOR BEAM
DECK BEAM
SIDE FRAME
SHEER
KEEL
FRAME DETAILS
SHADED PORTION IS FINISHED IN MAROON
PLANK DECKS WITH 6" STOCK THEN GROOVE TO LOOK 3" WIDE
GROOVES
BATTEN ALL DECK SEAMS
OUTSIDE PLANKING
MUSLIN
PLANK JOINTS
RUN A LIGHT BATTEN HERE
BREAST HOOK OF 1" OAK
FORMING KEEL AND KEELSON BY USE OF BLOCKS AND CLAMPS
KEELSON
STERN KNEE
2"X 6"X14'-0" USED AS A STRONGBACK
KEEL
BLOCK
"C" CLAMPS

Above are shown the top profile and several construction details. Note the double planking of the bottom with the painted muslin between. The grooves in decking are made with a file.

A Fourteen-Foot RUNABOUT

designed by

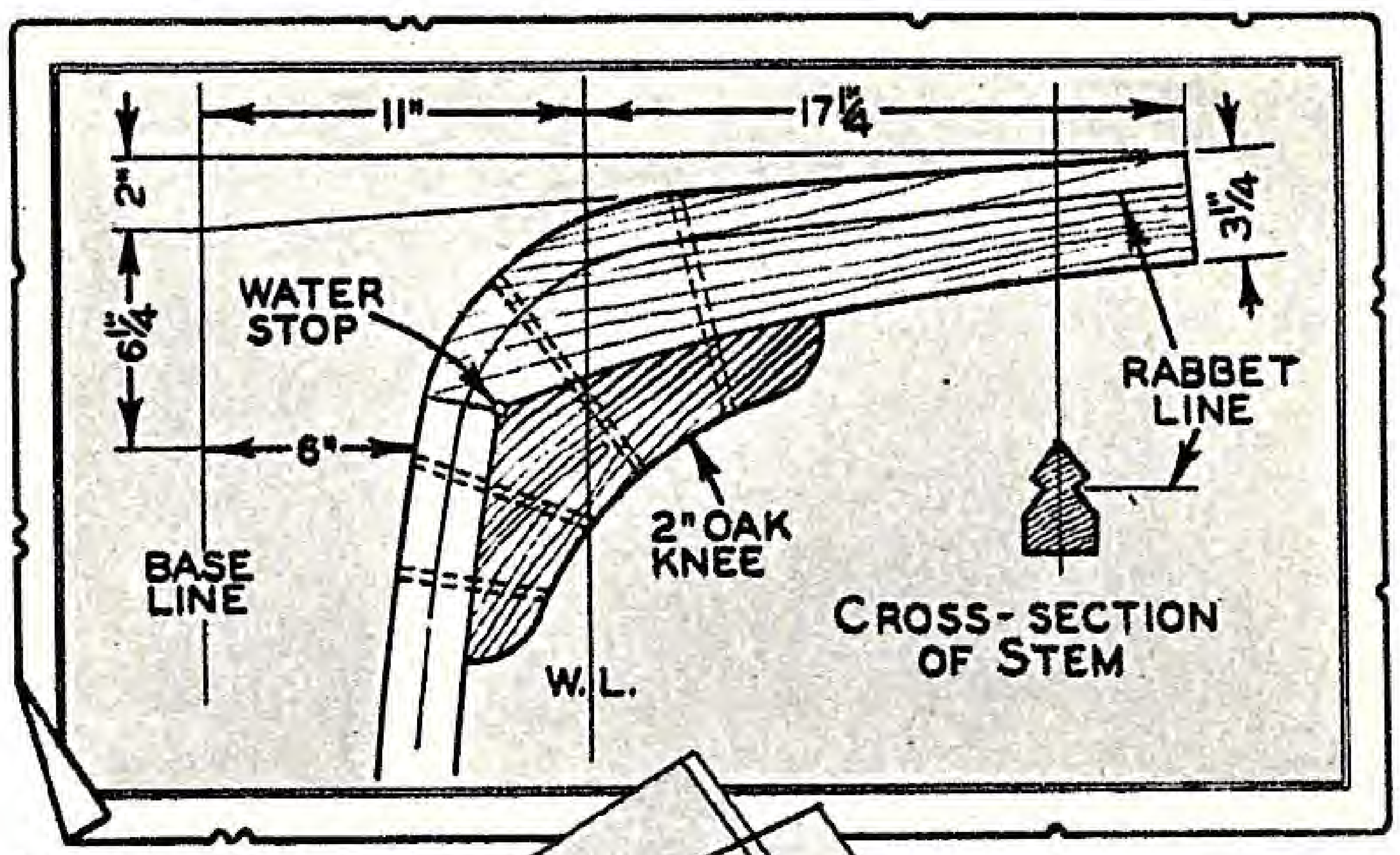
E. E. REED

ing materials for *Buzzers*. Thus the building instructions given here are directed to the amateur who wishes to save money and who has all winter to build his boat. If instructions are followed implicitly, the result will be as sturdy a little boat as ever was launched with a speed that varies with the size of motor desired.

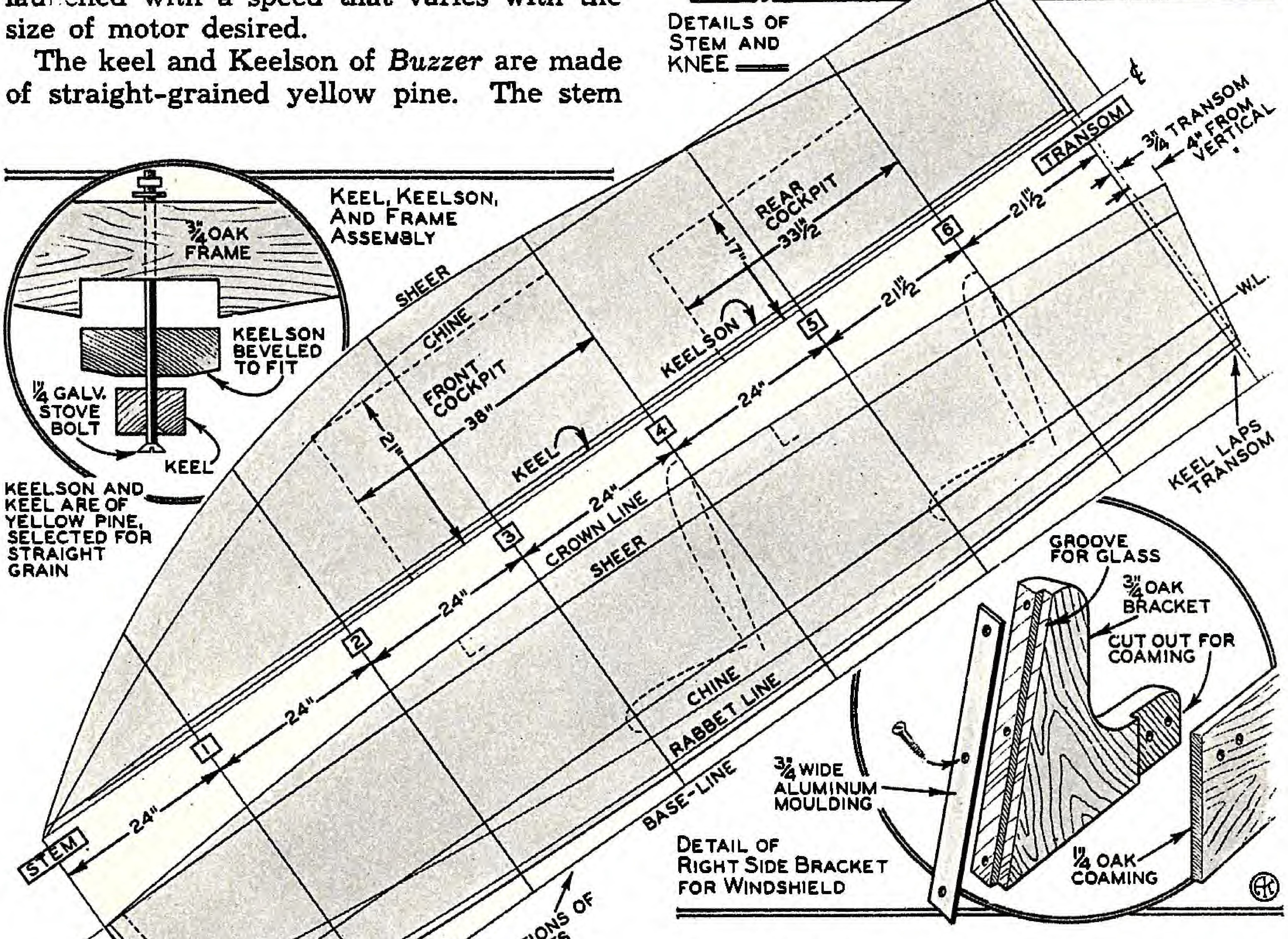
The keel and Keelson of *Buzzer* are made of straight-grained yellow pine. The stem is made of oak. These pieces form the primary step in the building of *Buzzer*. All are primed with white lead and oil and clamped to the form as shown in diagram. They are secured there by carriage bolts passed through keel, keelson and frame.

Whereas yellow pine is chosen for other members because it is sturdy and easy to work, the stem must be of oak. Any good scrap piece of two-inch oak will do.

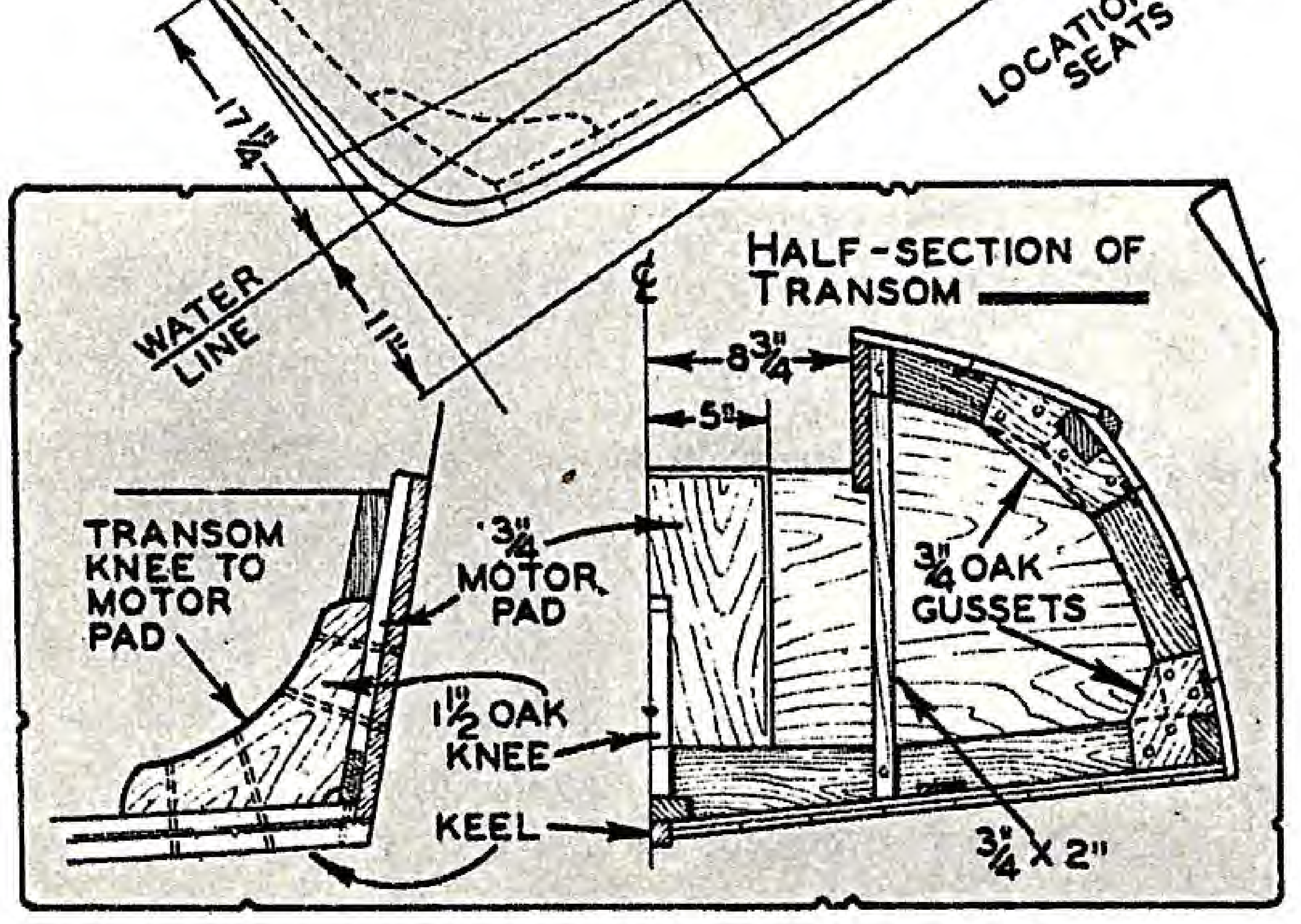
The form of which Buzzer was built was


11"
17¼
2"
6¼"
3¼
WATER STOP
RABBET LINE
6"
BASE LINE
2" OAK KNEE
W.L.
CROSS-SECTION OF STEM

DETAILS OF STEM AND KNEE


KEEL, KEELSON, AND FRAME ASSEMBLY
¾ OAK FRAME
KEELSON BEVELED TO FIT
¼ GALV. STOVE BOLT
KEEL
KEELSON AND KEEL ARE OF YELLOW PINE, SELECTED FOR STRAIGHT GRAIN
SHEER
CHINE
FRONT COCKPIT
38"
21"
REAR COCKPIT
33½
17"
KEELSON
KEEL
CROWN LINE
SHEER
CHINE
RABBET LINE
BASE-LINE
STEM
1
2
3
4
5
6
24"
24"
24"
24"
24"
21½
21½
TRANSOM
¾ TRANSOM 4" FROM VERTICAL
W.L.
KEEL LAPS TRANSOM
LOCATIONS OF SEATS
GROOVE FOR GLASS
¾ OAK BRACKET
CUT OUT FOR COAMING
¾ WIDE ALUMINUM MOULDING
¼ OAK COAMING
DETAIL OF RIGHT SIDE BRACKET FOR WINDSHIELD

Above right—The stem must be made of oak. In the drawing above, the front of the stem is at the top rather than at left. The windshield bracket directly above will be reversed when built for the left side of the boat.


17½
WATER LINE
11"
HALF-SECTION OF TRANSOM
8¾
5"
TRANSOM KNEE TO MOTOR PAD
¾ MOTOR PAD
1½ OAK KNEE
KEEL
¾ OAK GUSSETS
¾ X 2"

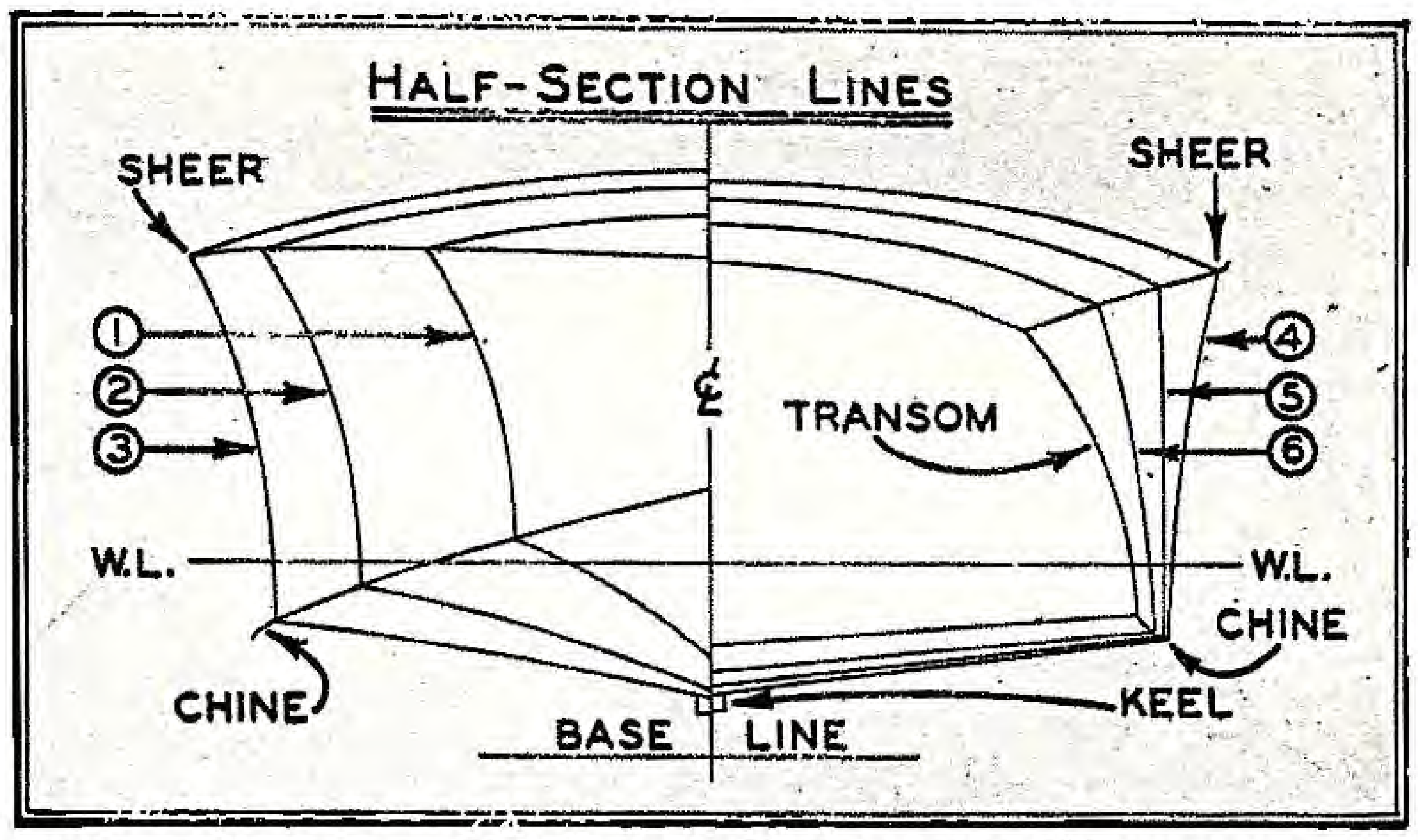
Above circle—All screws and bolts should be coated with marine glue to prevent rusting and loosening. At bottom left—Knee must be firm to withstand vibration of motor.

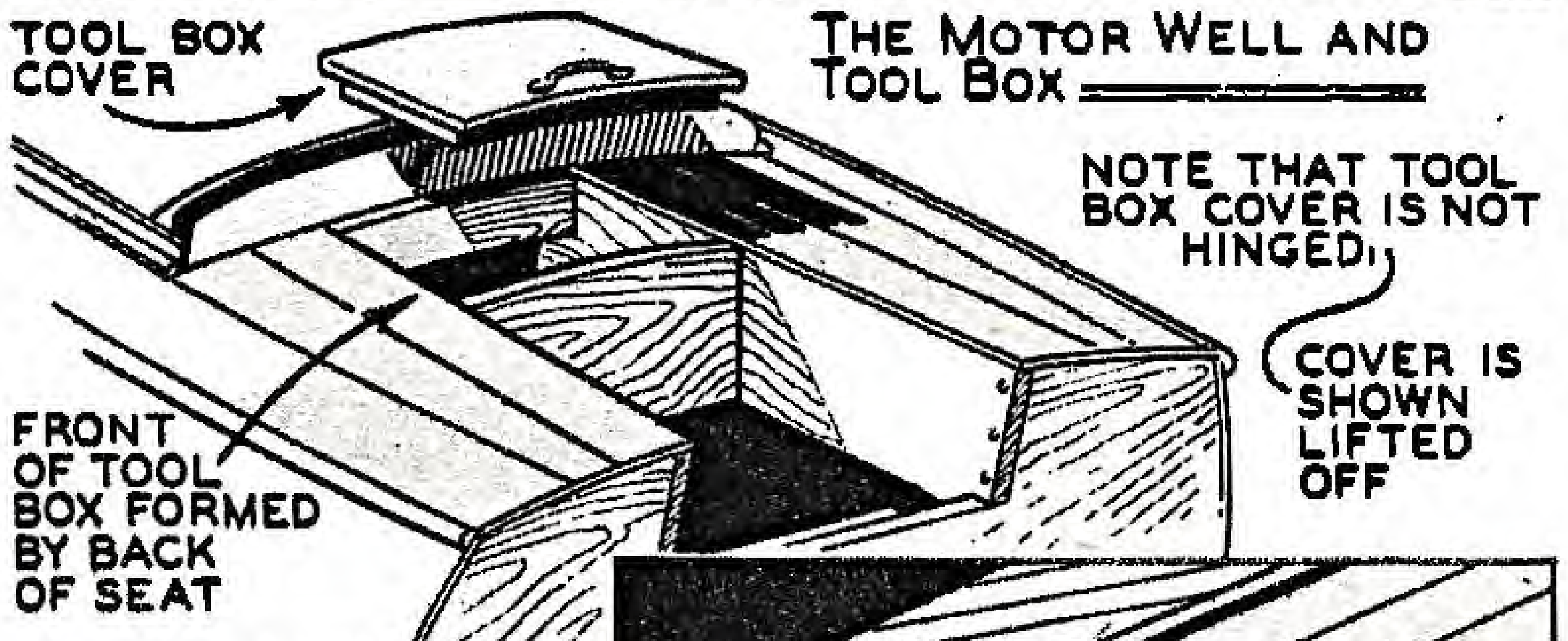
Marine Glue Keeps Bolts From Rusting Loose

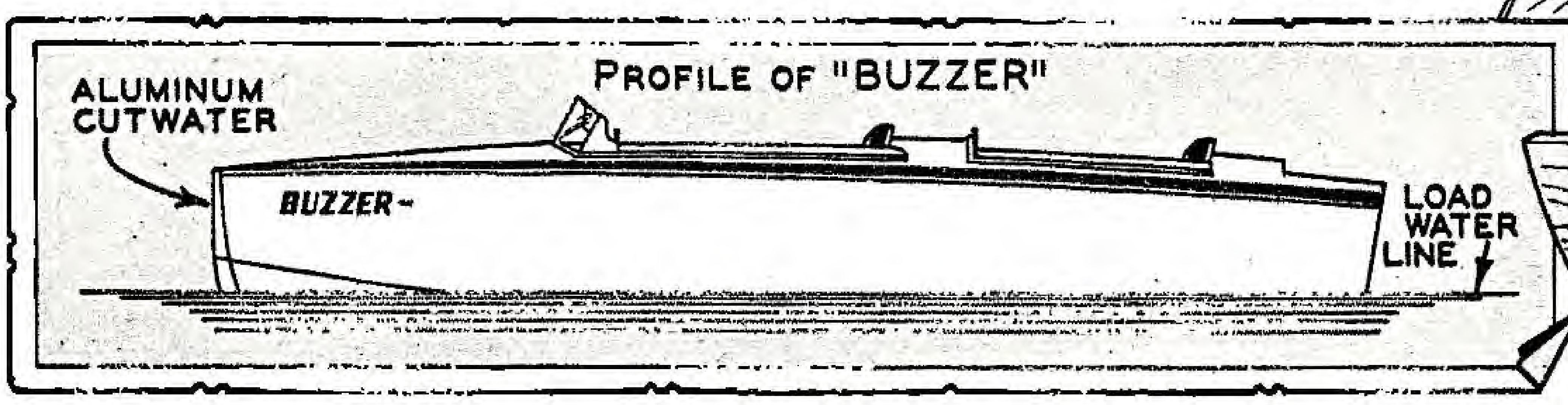
borrowed from a lumber yard and returned undamaged.

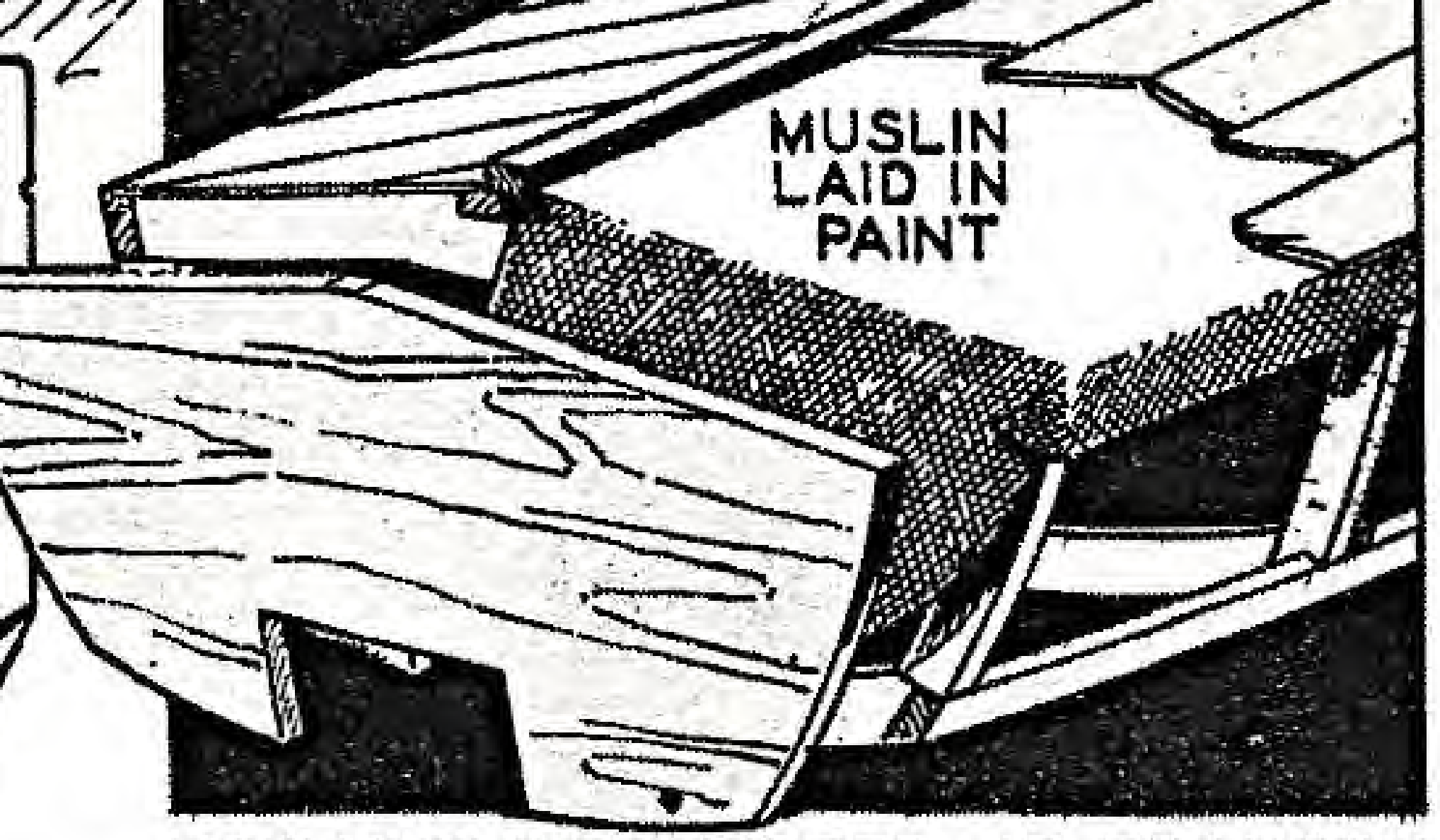
Frames, transom, motor pads, dash boards and paneling work required eight table leaves and most of a complete oak bedstead at a cost of $2. This, combined with the cost of chines, battens, sheer, brace-work, screws and bolts, brought the total cost of the completed frame to $5.

Another slight economy that helped break the price par was the use of cadmium plated iron screws which can be purchased at ⅓ the price of brass screws and are almost as durable in boat construction. Before using, they should be dipped in marine glue—as should all the bolts. This is an old boatbuilder's trick and sets the bolts in the wood so they will not rust or loosen from the wood.


HALF-SECTION LINES
SHEER
SHEER
①
②
③
④
⑤
⑥
℄
TRANSOM
W.L.
W.L.
CHINE
CHINE
BASE LINE
KEEL

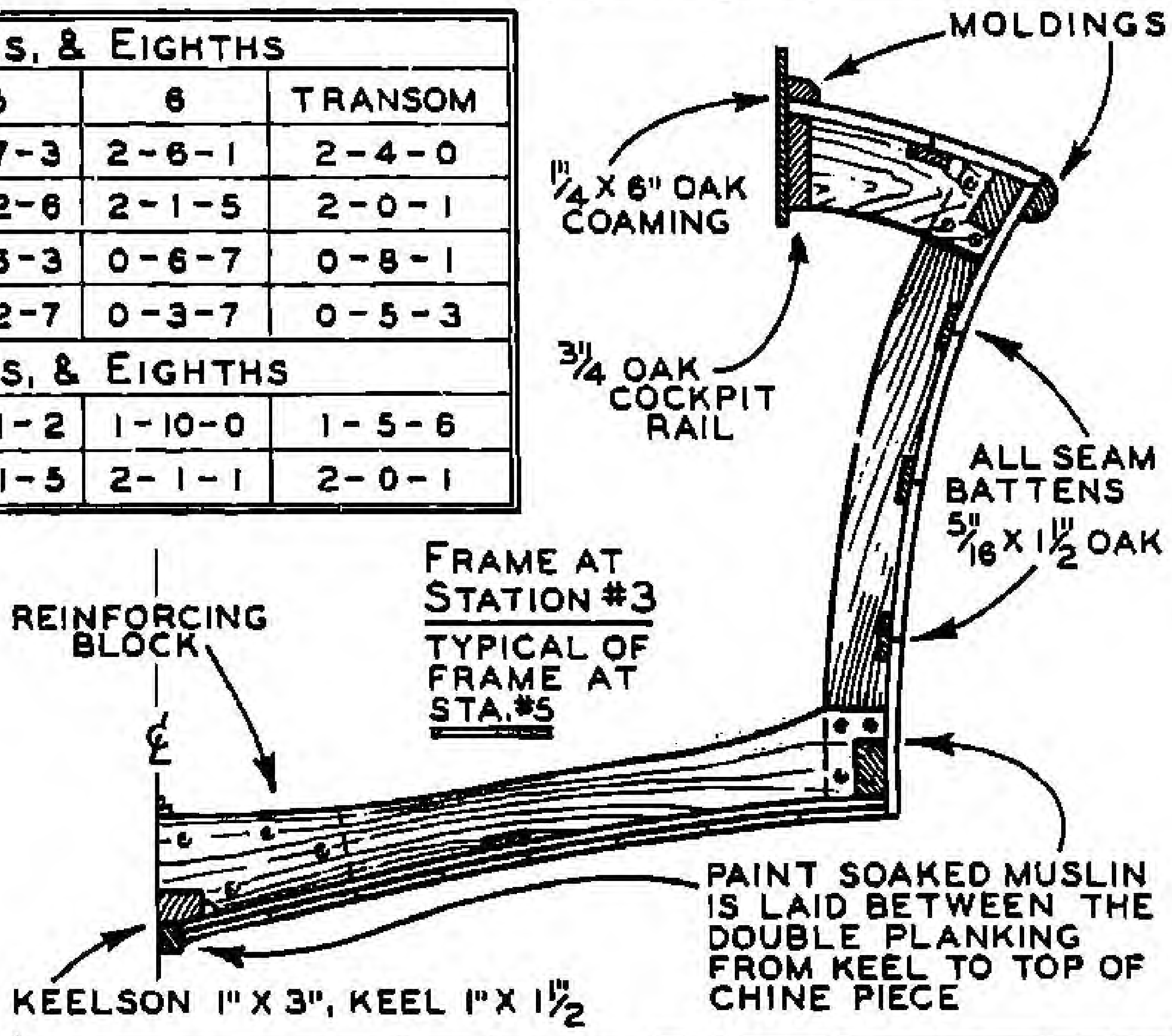

TOOL BOX COVER
THE MOTOR WELL AND TOOL BOX
NOTE THAT TOOL BOX COVER IS NOT HINGED.
COVER IS SHOWN LIFTED OFF
FRONT OF TOOL BOX FORMED BY BACK OF SEAT


PROFILE OF "BUZZER"
ALUMINUM CUTWATER
BUZZER
LOAD WATER LINE

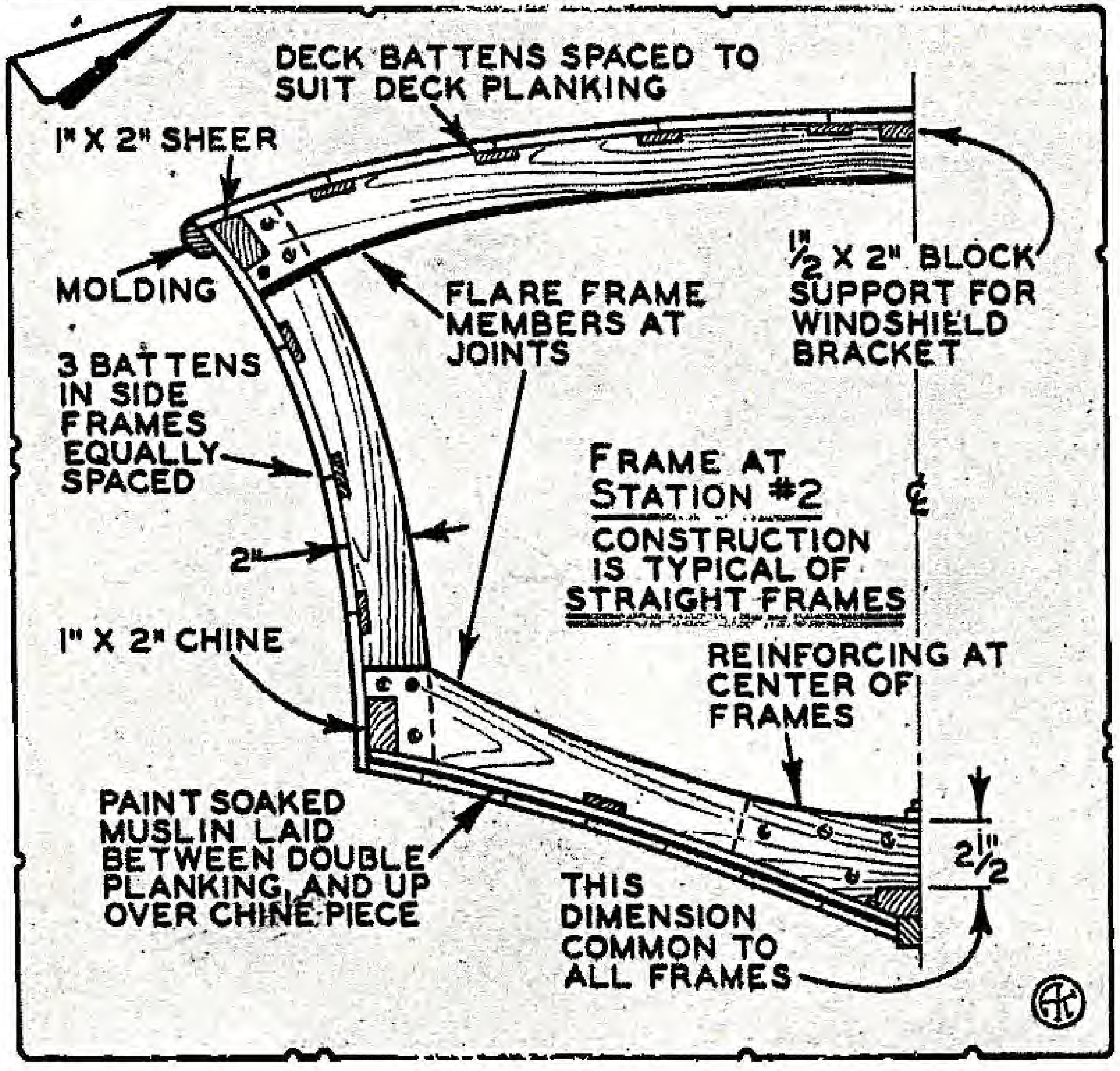

MUSLIN LAID IN PAINT

HOW MUSLIN IS FITTED AT TRANSOM

THE HEIGHTS ABOVE BASE-LINE, IN FT., INCHES, & EIGHTHS								
STATION	STEM	1	2	3	4	5	6	TRANSOM
CROWN	2-4-2	2-6-5	2-8-0	2-8-5	2-8-3	2-7-3	2-6-1	2-4-0
SHEER	2-4-2	2-4-5	2-4-5	2-4-3	2-3-5	2-2-6	2-1-5	2-0-1
CHINE	1-3-4	1-0-2	0-9-4	0-7-4	0-6-5	0-6-3	0-6-7	0-8-1
KEEL	-0-	0-4-2	0-2-4	0-2-3	0-2-4	0-2-7	0-3-7	0-5-3
THE HALF-BREADTHS, FROM THE ℄ IN FT., INCHES, & EIGHTHS								
SHEER	-0-	1-4-0	2-1-3	2-5-3	2-4-4	2-1-2	1-10-0	1-5-6
CHINE	-0-	0-11-0	1-8-7	2-0-5	2-1-7	2-1-5	2-1-1	2-0-1


MOLDINGS
1¼ X 6" OAK COAMING
¾ OAK COCKPIT RAIL
ALL SEAM BATTENS 5/16 X 1½ OAK
FRAME AT STATION #3
TYPICAL OF FRAME AT STA. #5
REINFORCING BLOCK
℄
PAINT SOAKED MUSLIN IS LAID BETWEEN THE DOUBLE PLANKING FROM KEEL TO TOP OF CHINE PIECE
KEELSON 1" X 3", KEEL 1" X 1½

In the half-section lines above, the lines to the left of the center represent the sections from bow to beam, the lines to the right, the section from transom to beam. When muslin is fitted to the bottom, it should be laid in a thick coat of paint.


DECK BATTENS SPACED TO SUIT DECK PLANKING
1" X 2" SHEER
MOLDING
FLARE FRAME MEMBERS AT JOINTS
½ X 2" BLOCK SUPPORT FOR WINDSHIELD BRACKET
3 BATTENS IN SIDE FRAMES EQUALLY SPACED
FRAME AT STATION #2
CONSTRUCTION IS TYPICAL OF STRAIGHT FRAMES
℄
2"
1" X 2" CHINE
REINFORCING AT CENTER OF FRAMES
PAINT SOAKED MUSLIN LAID BETWEEN DOUBLE PLANKING, AND UP OVER CHINE PIECE
THIS DIMENSION COMMON TO ALL FRAMES
2½

Above cross-section of frame gives a good impression of the fair of the side and crown curves. The frame on right shows the detail of coaming and decking around the cockpit.

A great saving can be made in the purchase of lumber for the boat. Planking for *Buzzer* was bought in one-inch materials which cost no more than ½-inch materials and furnish twice as much planking when re-sawed.

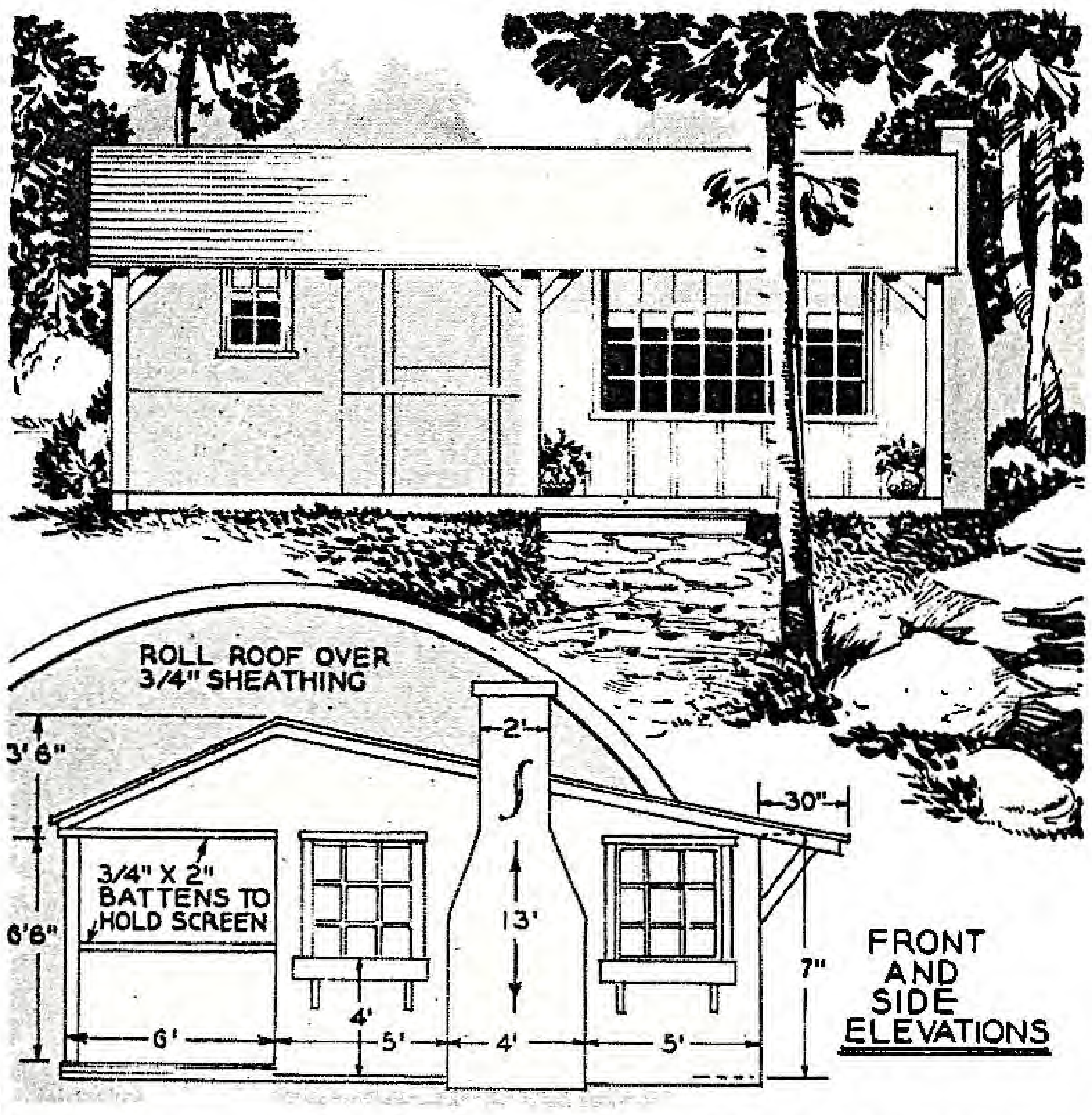
In re-sawing, do not try to cut wider

[*Continued on page* 122]

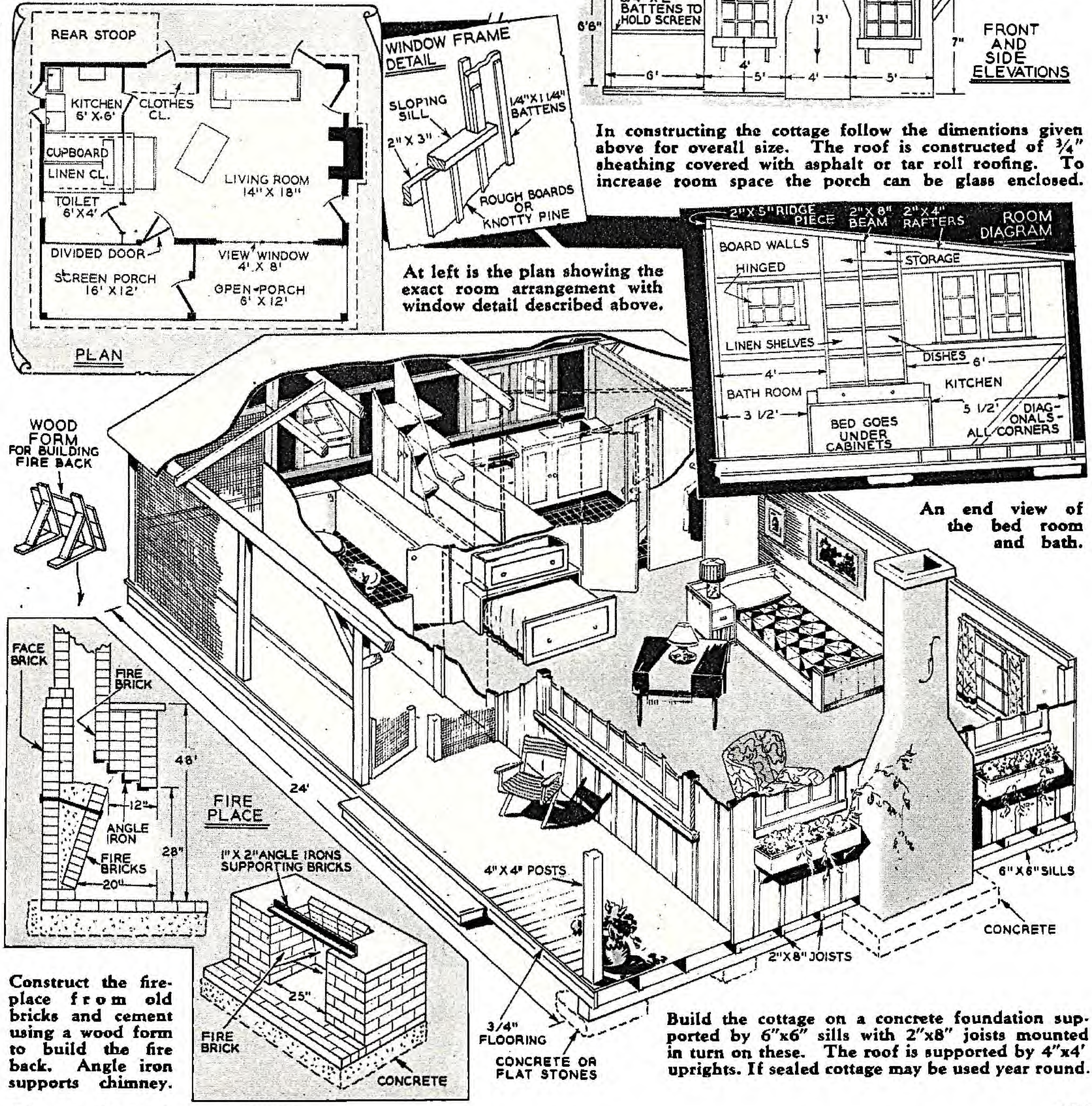
A Simple COTTAGE for VACATION USE

IDEAL for week-end vacation use at either the beach or mountains, this cottage may be constructed at a very nominal sum. Its construction may be of pine boards with batten where they join. If desired the builder may use wall board to improve the outside appearance.

The cottage includes a living room, bath and kitchen. At night the living room is converted into sleeping quarters by sliding out the bed which is nested under the linen closet and cupboard. A simple fireplace provides heat for chilly evenings.


ROLL ROOF OVER 3/4" SHEATHING
3'6"
2'
30"
3/4" X 2" BATTENS TO HOLD SCREEN
6'6"
13'
7"
4'
6'
5'
4'
5'
FRONT AND SIDE ELEVATIONS

In constructing the cottage follow the dimentions given above for overall size. The roof is constructed of 3/4" sheathing covered with asphalt or tar roll roofing. To increase room space the porch can be glass enclosed.


REAR STOOP
KITCHEN 6' X 6'
CLOTHES CL.
CUPBOARD
LINEN CL.
TOILET 6'X4'
LIVING ROOM 14" X 18"
DIVIDED DOOR
VIEW WINDOW 4' X 8'
SCREEN PORCH 16' X 12'
OPEN-PORCH 6' X 12'
PLAN
WINDOW FRAME DETAIL
SLOPING SILL
2" X 3"
1/4" X 1 1/4" BATTENS
ROUGH BOARDS OR KNOTTY PINE
2" X 5" RIDGE PIECE
2" X 8" BEAM
2" X 4" RAFTERS
ROOM DIAGRAM
BOARD WALLS
HINGED
STORAGE
LINEN SHELVES
DISHES
6'
4'
KITCHEN
BATH ROOM
3 1/2'
5 1/2'
DIAGONALS-ALL CORNERS
BED GOES UNDER CABINETS
WOOD FORM FOR BUILDING FIRE BACK
FACE BRICK
FIRE BRICK
48'
12"
ANGLE IRON
FIRE BRICKS
28"
20"
FIRE PLACE
24'
1" X 2" ANGLE IRONS SUPPORTING BRICKS
25"
FIRE BRICK
CONCRETE
4" X 4" POSTS
3/4" FLOORING
CONCRETE OR FLAT STONES
2" X 8" JOISTS
6" X 6" SILLS
CONCRETE

At left is the plan showing the exact room arrangement with window detail described above.

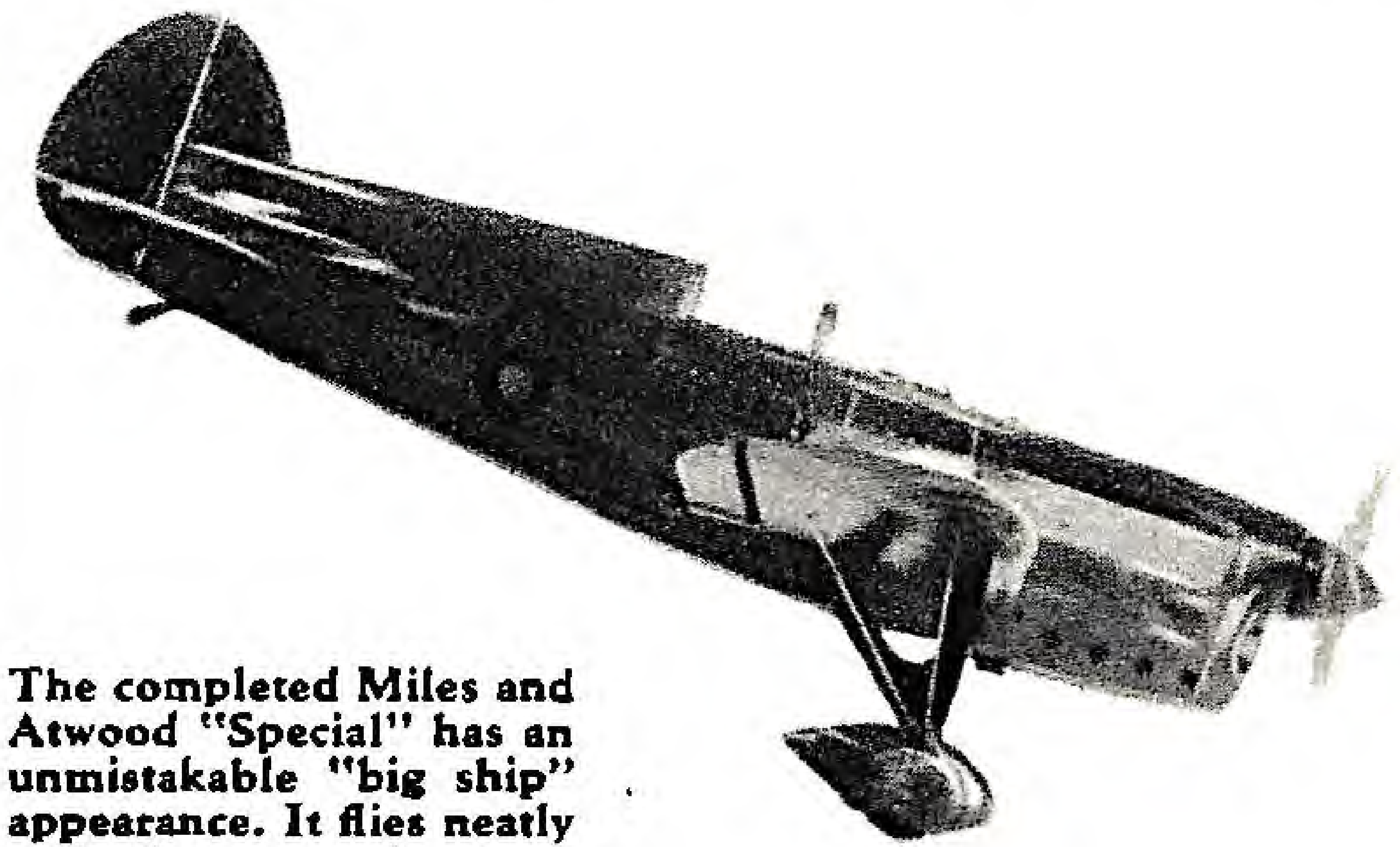
An end view of the bed room and bath.

Construct the fireplace from old bricks and cement using a wood form to build the fire back. Angle iron supports chimney.

Build the cottage on a concrete foundation supported by 6"x6" sills with 2"x8" joists mounted in turn on these. The roof is supported by 4"x4' uprights. If sealed cottage may be used year round.

Building FLYING MODELS of

Assembling the bulkheads to the tube or jig which forms the backbone of the completed model. This sensational form of construction assures a rigid backbone for the model.



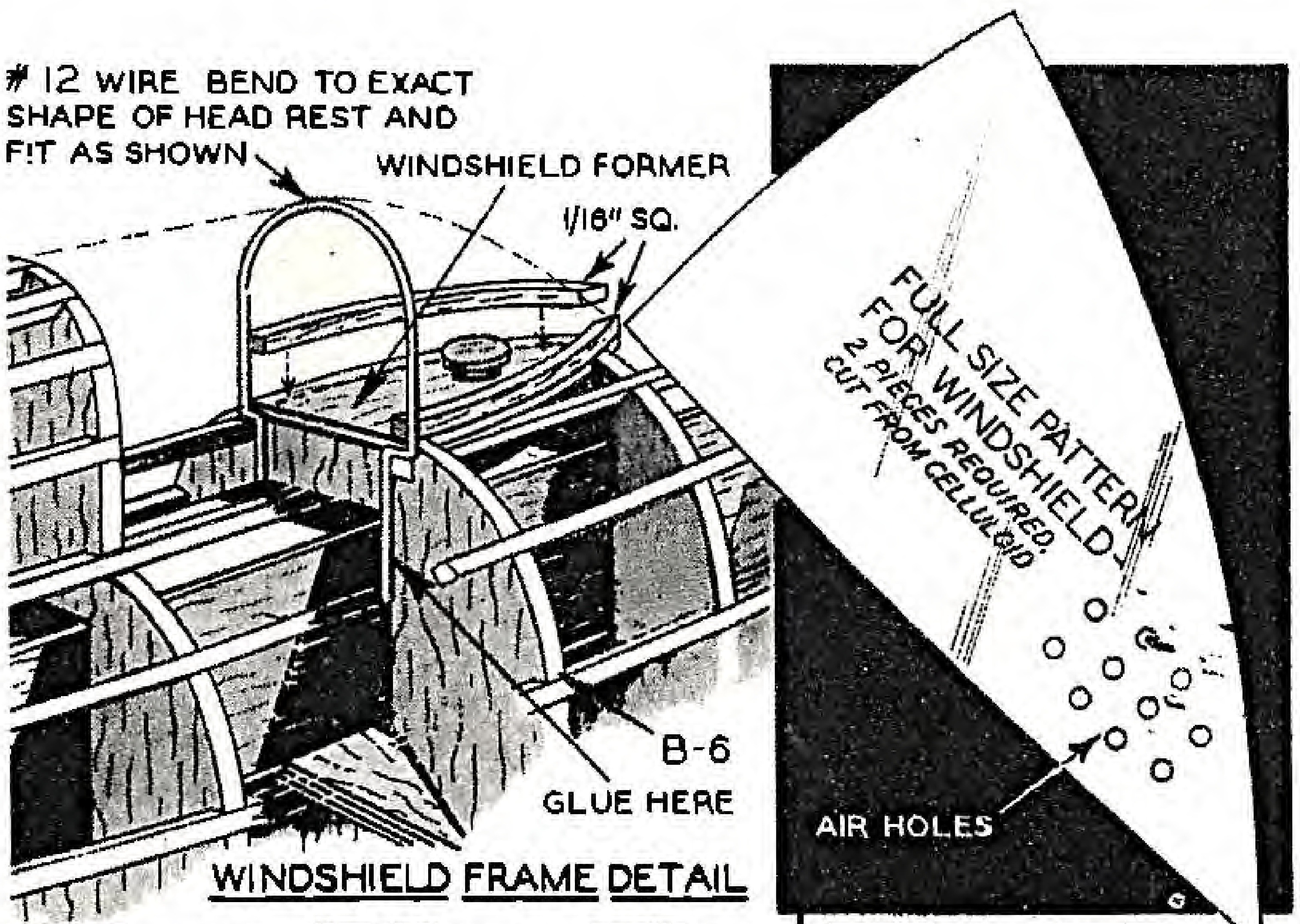
The completed Miles and Atwood "Special" has an unmistakable "big ship" appearance. It flies neatly and the controls work automatically in flight.

PART I

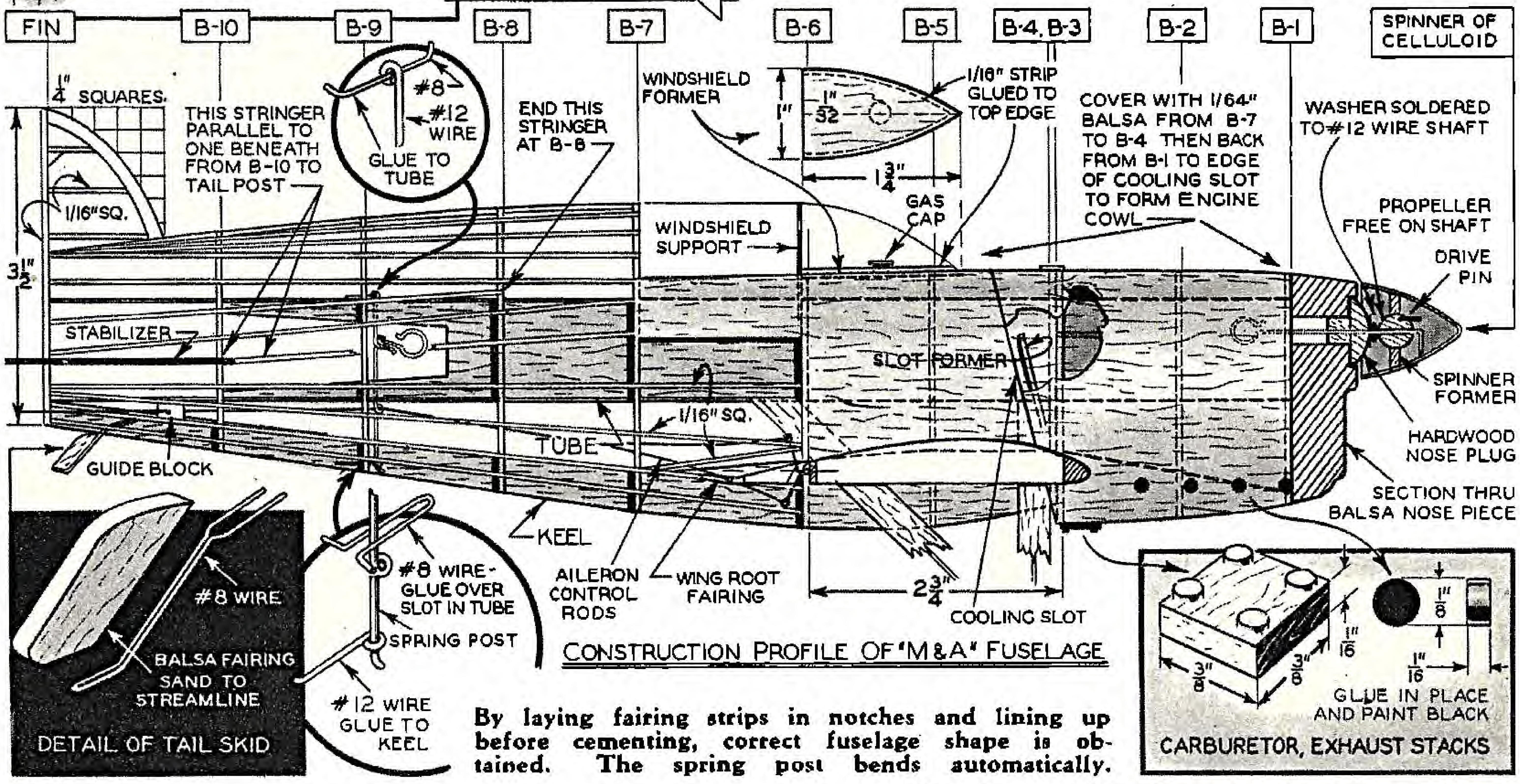
MODEL builders will be particularly intrigued by the unique features incorporated in the new MM—Lawrence W. Brown flying scale models, designed by Daniel E. Holloway. The Miles and Atwood "Special," holder of the 1935 American light plane speed record of 233.33 m. p. h., has been faithfully reproduced so that the completed model is a miniature duplicate of its famous prototype.

Like the "Miss Los Angeles," plans for which will be presented in a forthcoming issue, this model incorporates advanced features of construction and may be fitted with controls that really work in flight.

This control system is as simple as it is unique. Primarily designed to counteract propeller torque and produce steady flight, it can be set to produce banks, loops, and barrel rolls. Briefly described, the system employs



# 12 WIRE BEND TO EXACT SHAPE OF HEAD REST AND FIT AS SHOWN
WINDSHIELD FORMER
1/16" SQ.
FULL SIZE PATTERN FOR WINDSHIELD
2 PIECES REQUIRED CUT FROM CELLULOID
B-6
GLUE HERE
AIR HOLES
WINDSHIELD FRAME DETAIL

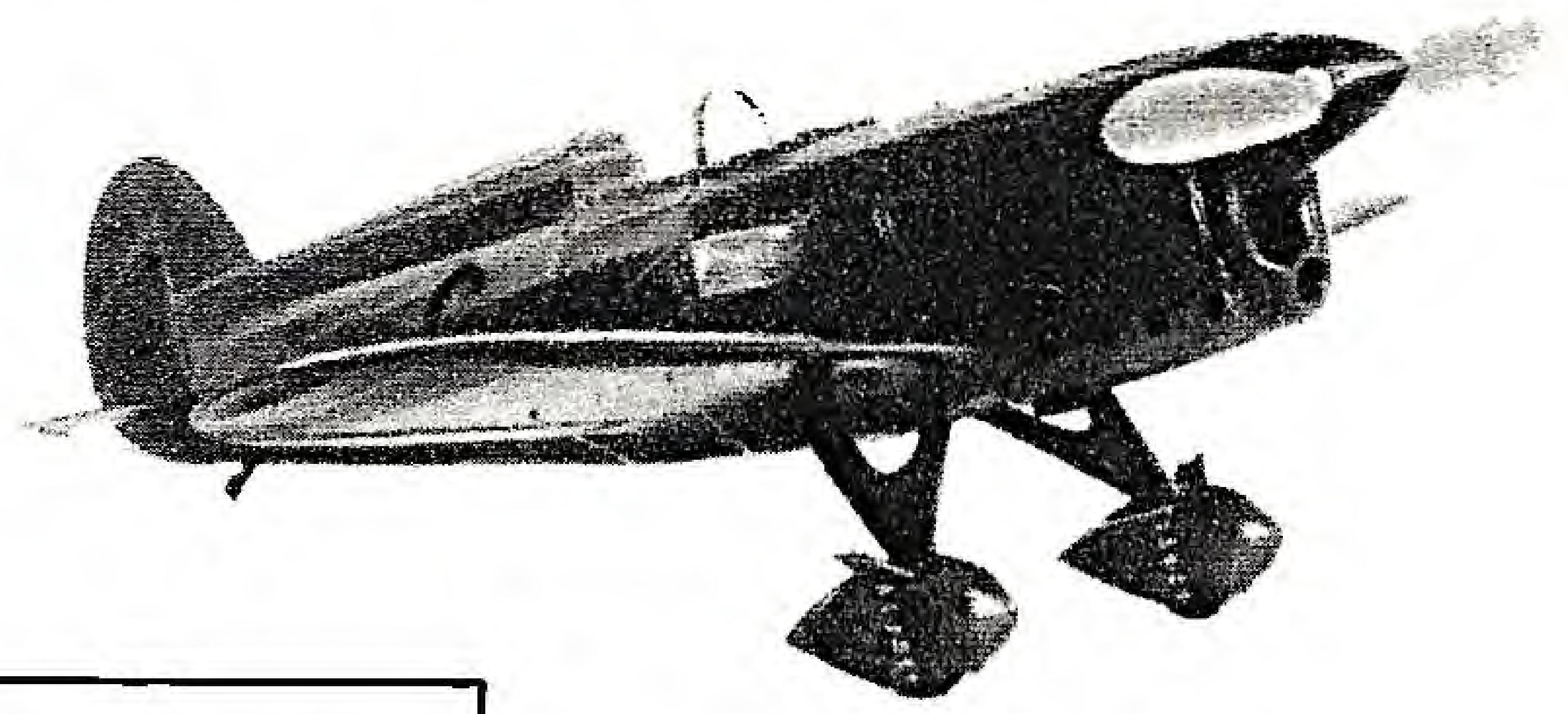


FIN
B-10
B-9
B-8
B-7
B-6
B-5
B-4, B-3
B-2
B-1
SPINNER OF CELLULOID
1/4" SQUARES.
THIS STRINGER PARALLEL TO ONE BENEATH FROM B-10 TO TAIL POST
#8
#12 WIRE
GLUE TO TUBE
END THIS STRINGER AT B-8
WINDSHIELD FORMER
1"
1/32"
1 3/4"
1/16" STRIP GLUED TO TOP EDGE
GAS CAP
COVER WITH 1/64" BALSA FROM B-7 TO B-4 THEN BACK FROM B-1 TO EDGE OF COOLING SLOT TO FORM ENGINE COWL
WASHER SOLDERED TO #12 WIRE SHAFT
PROPELLER FREE ON SHAFT
DRIVE PIN
1/16" SQ.
3 1/2"
WINDSHIELD SUPPORT
STABILIZER
SLOT FORMER
SPINNER FORMER
HARDWOOD NOSE PLUG
SECTION THRU BALSA NOSE PIECE
1/16" SQ.
TUBE
GUIDE BLOCK
KEEL
#8 WIRE
BALSA FAIRING SAND TO STREAMLINE
DETAIL OF TAIL SKID
#8 WIRE-GLUE OVER SLOT IN TUBE
SPRING POST
#12 WIRE GLUE TO KEEL
AILERON CONTROL RODS
WING ROOT FAIRING
2 3/4"
COOLING SLOT
CONSTRUCTION PROFILE OF "M & A" FUSELAGE
3/8"
3/8"
1/16"
1/8"
1/16"
GLUE IN PLACE AND PAINT BLACK
CARBURETOR, EXHAUST STACKS

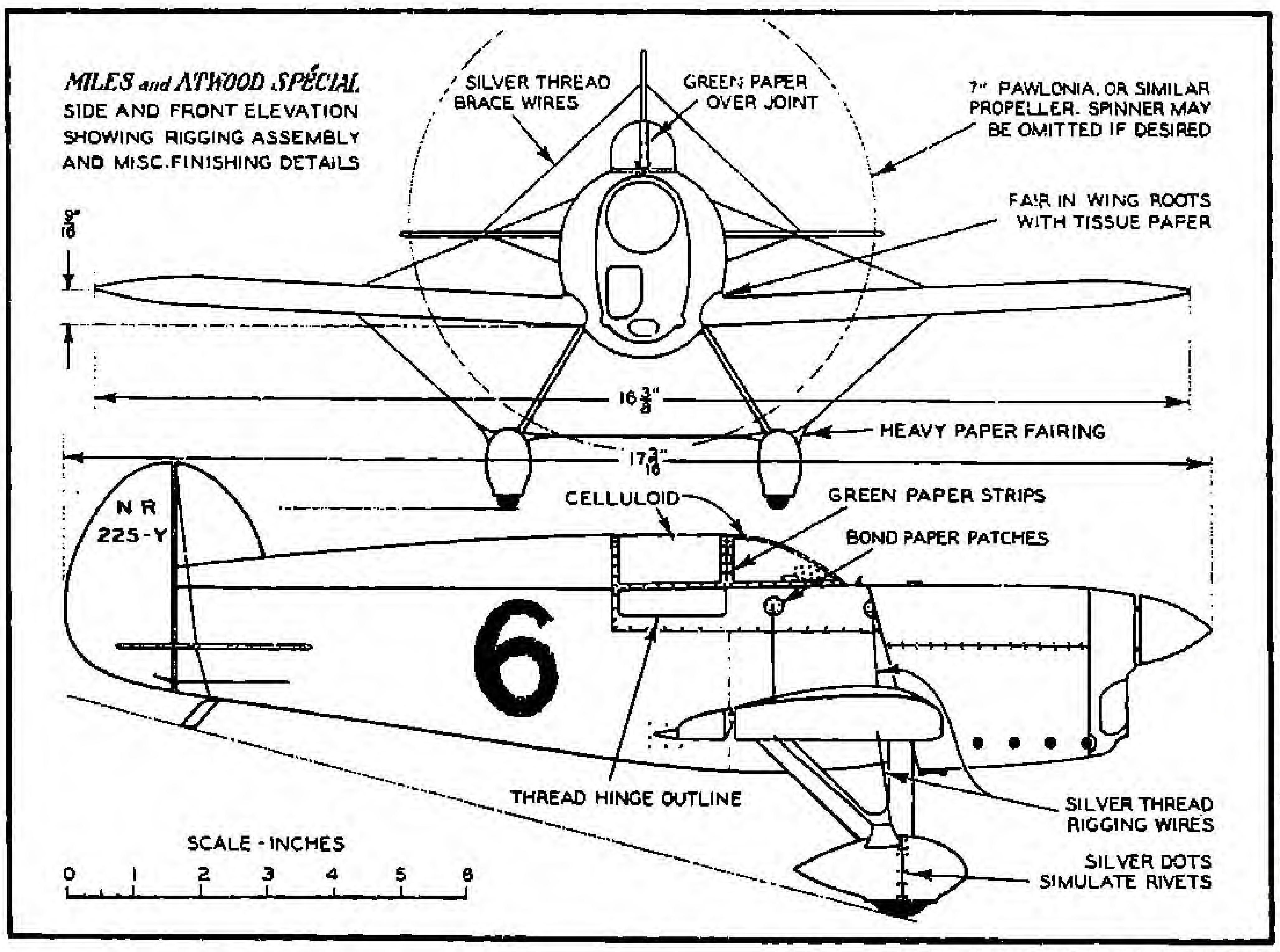
By laying fairing strips in notches and lining up before cementing, correct fuselage shape is obtained. The spring post bends automatically.

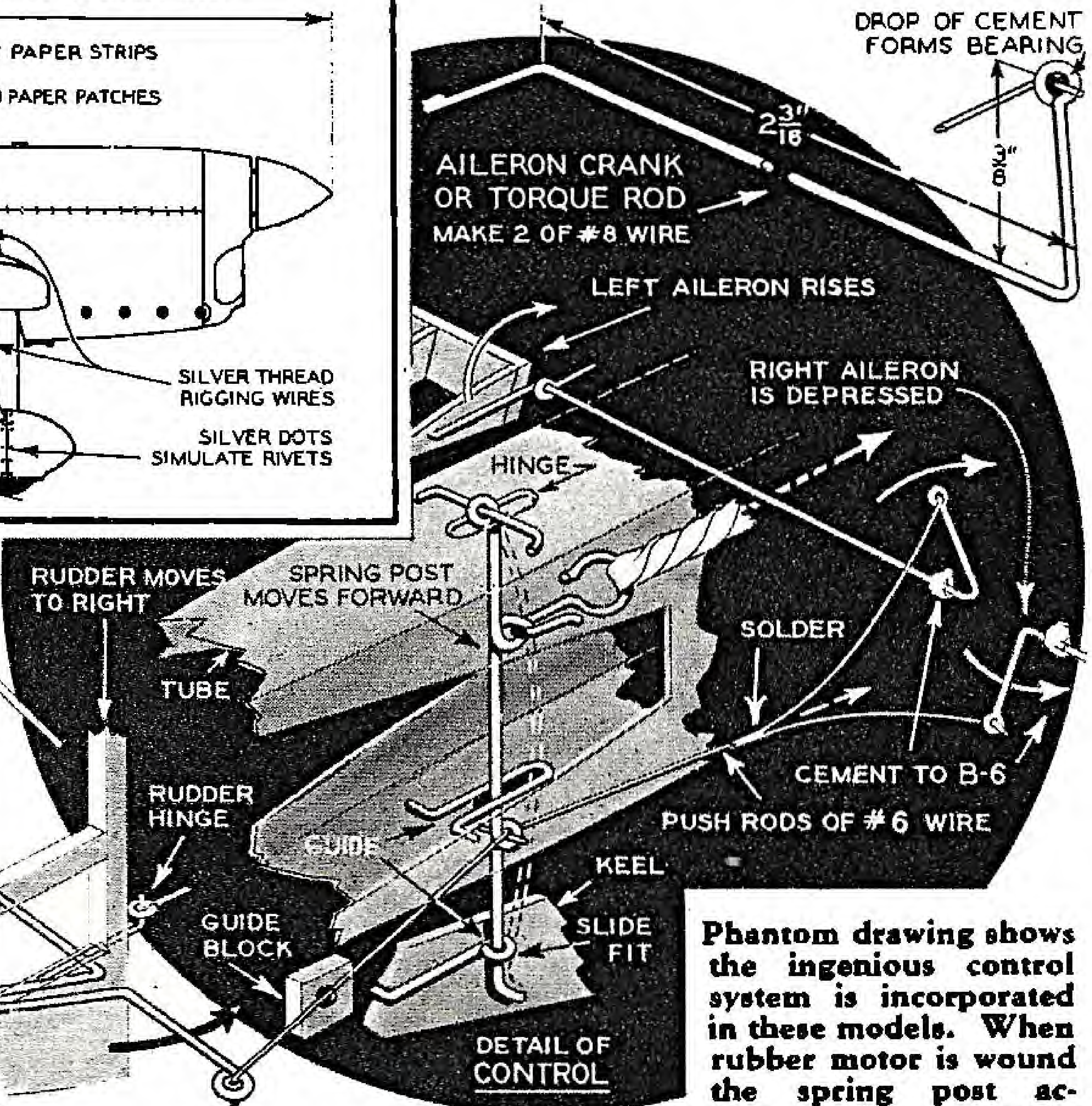
FAMOUS RACING PLANES

Embodying automatic controls and novel fuselage construction, the Miles and Atwood "Special" is the first of two accurately scaled miniature flying ships.

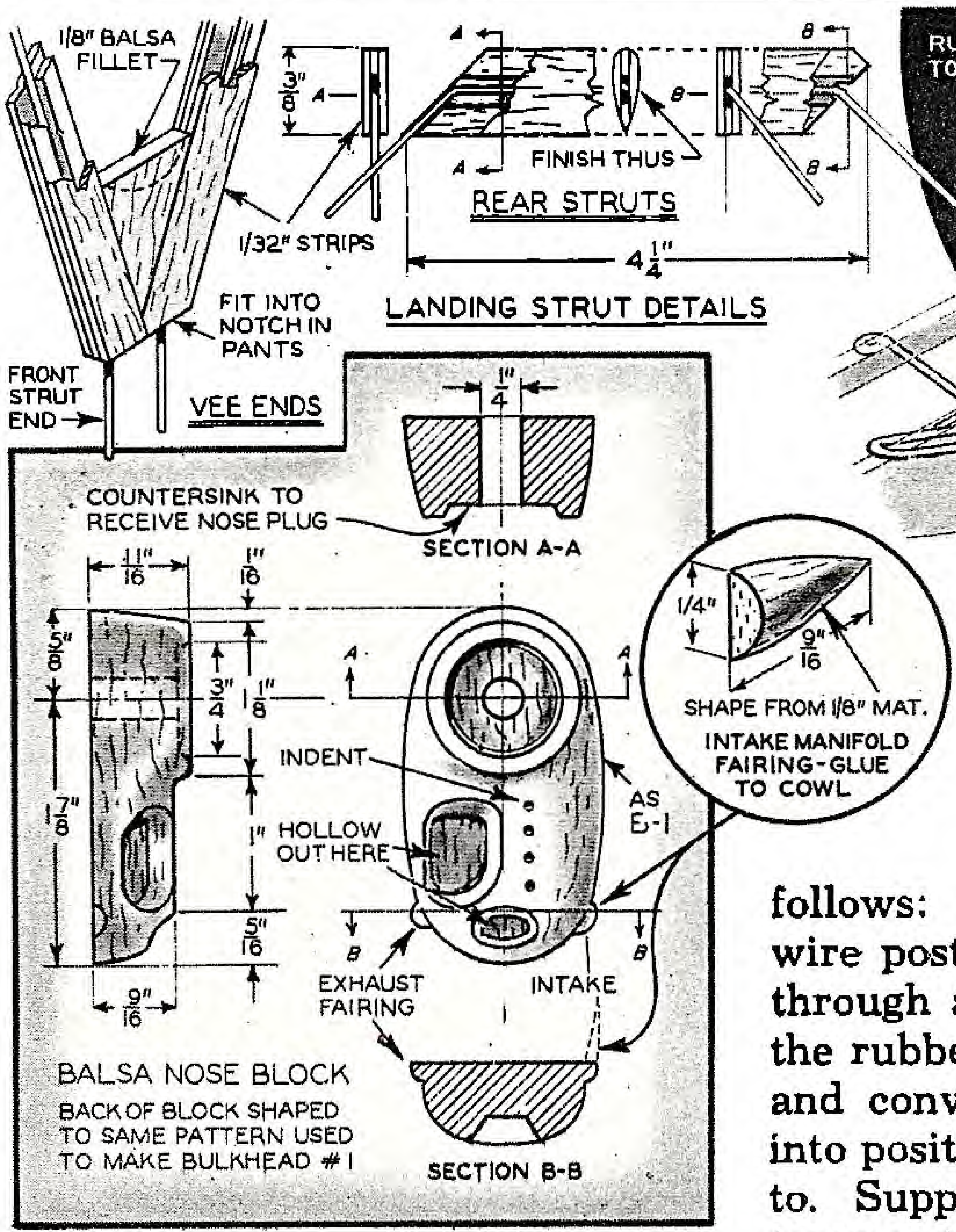


Another view of the completed Miles and Atwood "Special." The high gloss all-green finish with black numerals adds to the striking resemblance this tiny ship bears to its record breaking prototype. At left—Outlines of the plane with overall dimensions and miscellaneous finishing details shown.


MILES and ATWOOD SPECIAL
SIDE AND FRONT ELEVATION SHOWING RIGGING ASSEMBLY AND MISC. FINISHING DETAILS
SILVER THREAD BRACE WIRES
GREEN PAPER OVER JOINT
7" PAWLONIA, OR SIMILAR PROPELLER. SPINNER MAY BE OMITTED IF DESIRED
FAIR IN WING ROOTS WITH TISSUE PAPER
9/16"
16 3/8"
HEAVY PAPER FAIRING
17 3/16"
CELLULOID
GREEN PAPER STRIPS
BOND PAPER PATCHES
NR 225-Y
6
THREAD HINGE OUTLINE
SILVER THREAD RIGGING WIRES
SILVER DOTS SIMULATE RIVETS
SCALE - INCHES
0 1 2 3 4 5 6


DROP OF CEMENT FORMS BEARING
2 3/16"
3/8"
AILERON CRANK OR TORQUE ROD
MAKE 2 OF #8 WIRE
LEFT AILERON RISES
RIGHT AILERON IS DEPRESSED
HINGE
RUDDER MOVES TO RIGHT
SPRING POST MOVES FORWARD
TUBE
SOLDER
CEMENT TO B-6
PUSH RODS OF #6 WIRE
RUDDER HINGE
GUIDE
KEEL
GUIDE BLOCK
SLIDE FIT
DETAIL OF CONTROL

Phantom drawing shows the ingenious control system is incorporated in these models. When rubber motor is wound the spring post actuates the controls.


1/8" BALSA FILLET
3/8"
A
B
1/32" STRIPS
FINISH THUS
REAR STRUTS
4 1/4"
FIT INTO NOTCH IN PANTS
LANDING STRUT DETAILS
FRONT STRUT END
VEE ENDS
1/4"
COUNTERSINK TO RECEIVE NOSE PLUG
SECTION A-A
11/16"
1/16"
5/8"
3/4"
1/8"
1/4"
9/16"
SHAPE FROM 1/8" MAT.
INTAKE MANIFOLD FAIRING-GLUE TO COWL
INDENT
AS E-1
1 7/8"
1" HOLLOW OUT HERE
5/16"
9/16"
EXHAUST FAIRING
INTAKE
BALSA NOSE BLOCK
BACK OF BLOCK SHAPED TO SAME PATTERN USED TO MAKE BULKHEAD #1
SECTION B-B

The nose piece is carved from soft balsa to simulate the Menasco C-4-S "Pirate" front cowling. Top drawing shows how landing struts are built up around wire.

the tension produced by the rubber motor when fully wound to actuate control rods connected to ailerons, rudder, elevators or wing flaps.

In practice the system is carried out as follows: The rear rubber hook is attached to a spring wire post which is pivoted at the top and free to slide through a guide or loop at the bottom. The tension of the rubber motor when wound springs the post forward and converts this movement through rods and cranks into positive action of the control surfaces it is connected to. Suppose we wish to overcome the effect of propeller torque, to take a concrete example. By hooking the control (ailerons and rudder) to the spring post and adjusting them so that as the motor is wound and the

FULL SIZE BULKHEADS ARE CUT FROM SHEET BALSA

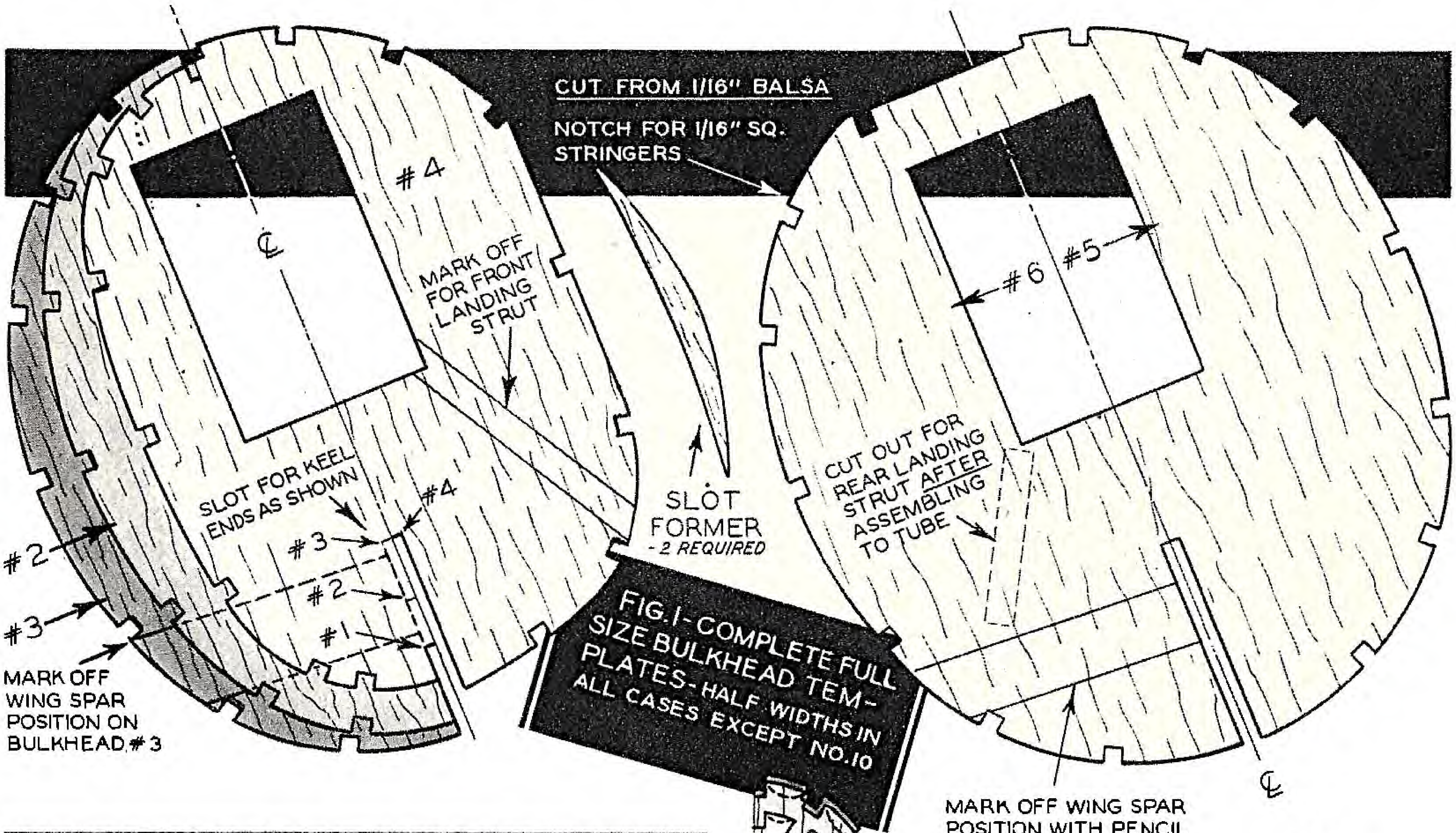
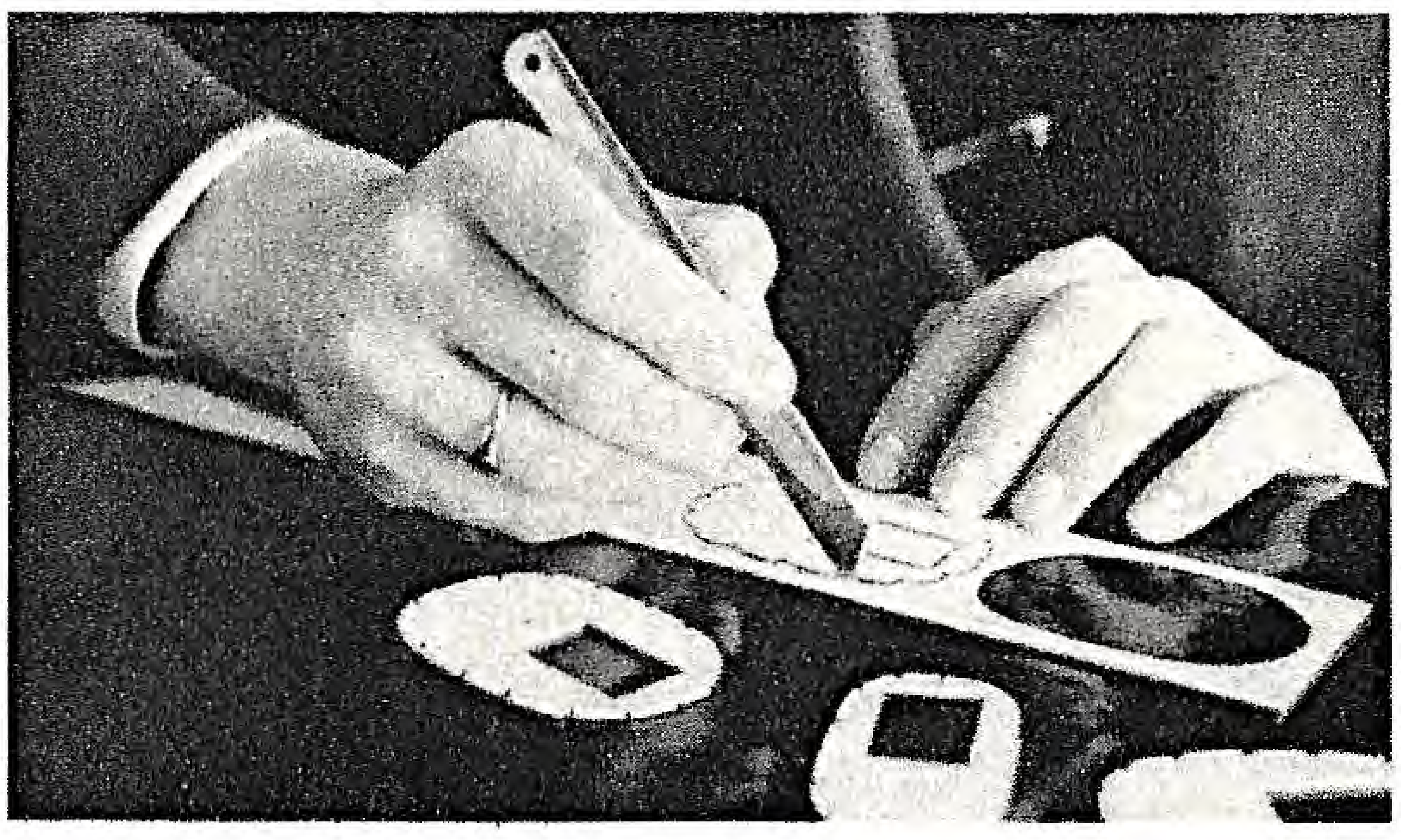
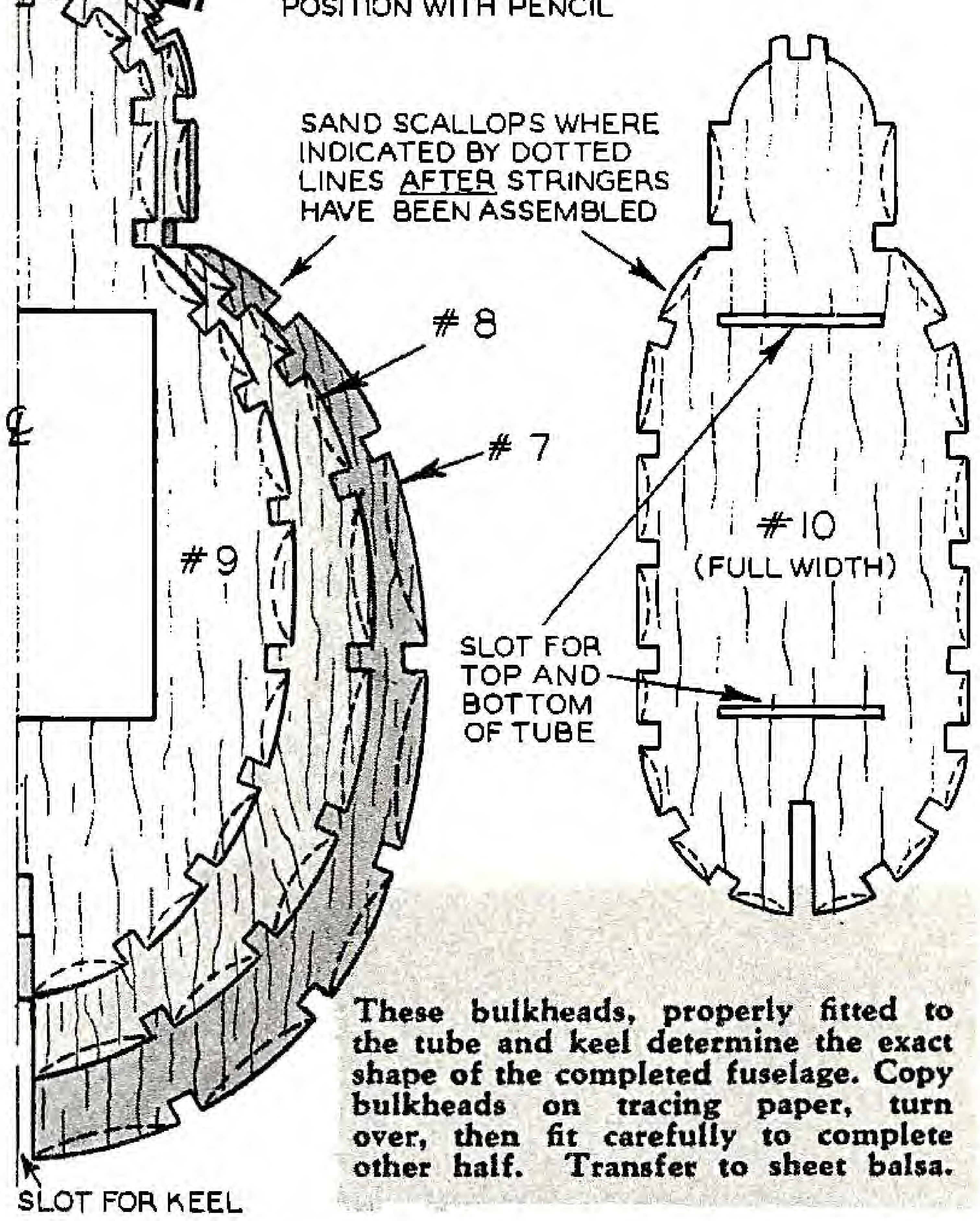

CUT FROM 1/16" BALSA
NOTCH FOR 1/16" SQ. STRINGERS
#4
℄
MARK OFF FOR FRONT LANDING STRUT
SLOT FOR KEEL ENDS AS SHOWN
#4
#3
#2
#1
#2
#3
MARK OFF WING SPAR POSITION ON BULKHEAD #3
SLOT FORMER - 2 REQUIRED
#6
#5
CUT OUT FOR REAR LANDING STRUT AFTER ASSEMBLING TO TUBE
MARK OFF WING SPAR POSITION WITH PENCIL
℄

FIG. 1 - COMPLETE FULL SIZE BULKHEAD TEMPLATES - HALF WIDTHS IN ALL CASES EXCEPT NO. 10



Cutting out the bulkheads with a special razor knife. The full lines are first transferred from the half-widths given on the plans. Cut beyond the outline and finish off to exact outline.


SAND SCALLOPS WHERE INDICATED BY DOTTED LINES AFTER STRINGERS HAVE BEEN ASSEMBLED
#8
#7
℄
#9
#10
(FULL WIDTH)
SLOT FOR TOP AND BOTTOM OF TUBE
SLOT FOR KEEL

These bulkheads, properly fitted to the tube and keel determine the exact shape of the completed fuselage. Copy bulkheads on tracing paper, turn over, then fit carefully to complete other half. Transfer to sheet balsa.

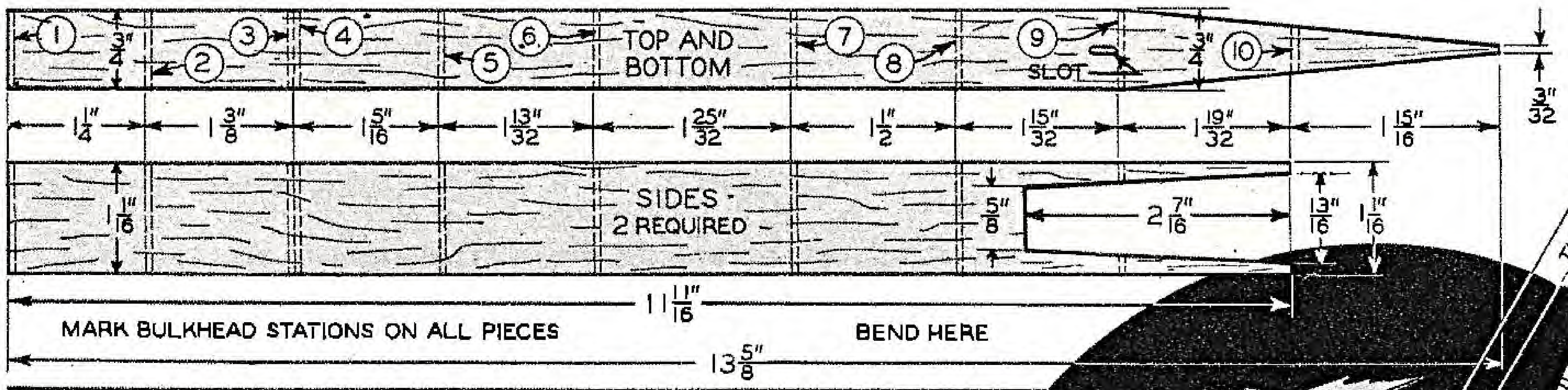
tension increases these two surfaces are moved slightly in the required directions to counteract the turning effect produced by the propeller. Then, as soon as the power is expended and the spring post returns to its normal vertical position, the controls likewise return to neutral. Thus, when the power is expended, the plane continues in a normal straight glide.

The illustration of the controls shows aileron and rudder hook up only. The flippers can easily be connected as well so that when the motor is wound they assume a neutral position, raising slightly as the power goes off to keep the nose up and extend the glide.

Proceeding now to the construction of the ship itself we might in passing say that both the M & A "Special" and the "Miss Los Angeles" are constructed similarly and that, therefore, much of the building description given here will apply to the next model and as such will not be repeated then.

Both models are available in kit form if desired. Although complete construction details are presented here, model builders can obtain individual parts, if desired. Normal model making material is used throughout. Balsa, in strip, sheet and block form the main ingredient. Sizes are clearly noted on the accompanying drawings.

FUSELAGE TUBE FORMS RIGID BACKBONE for MODEL



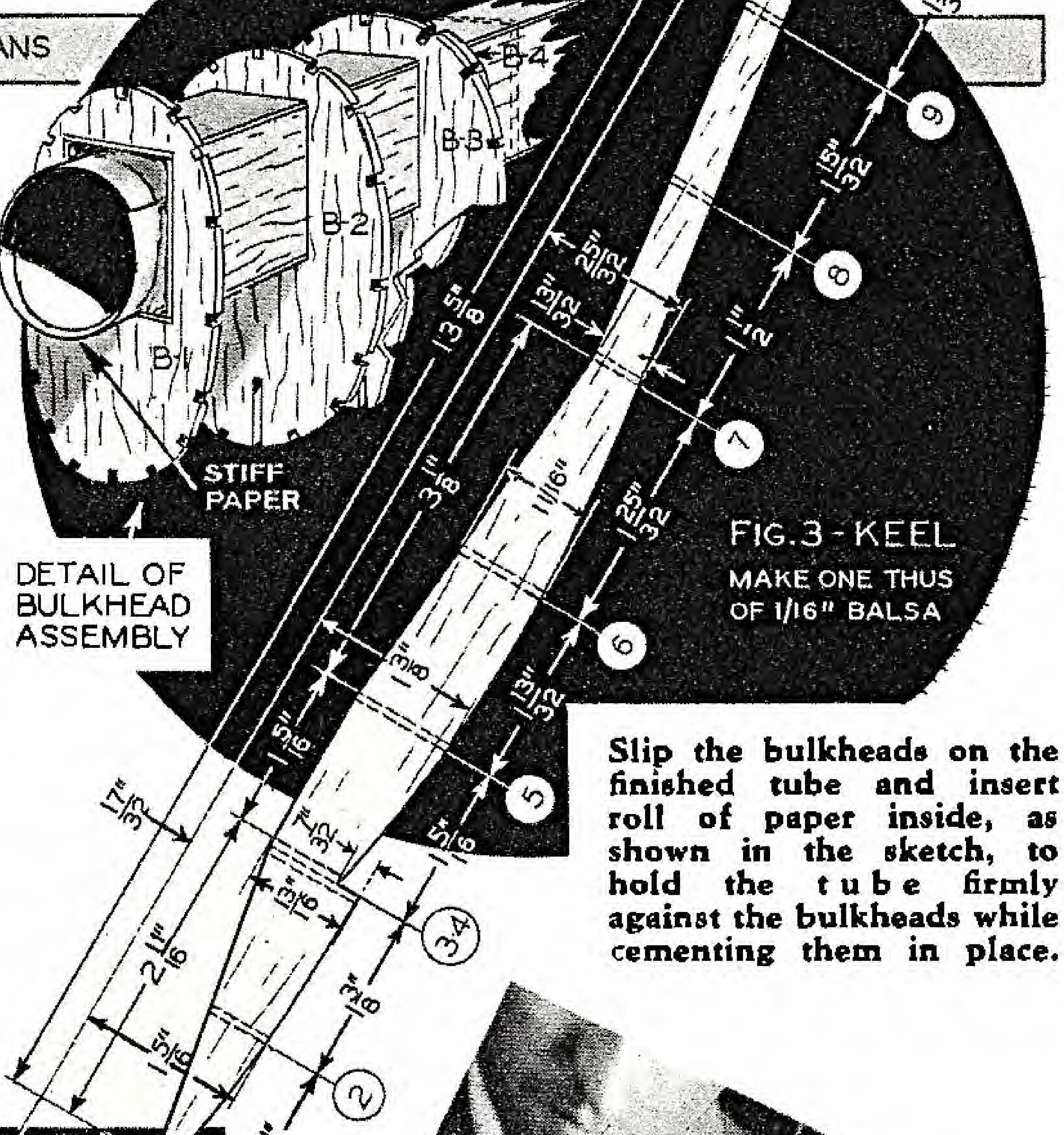
1
2
3
4
5
6
7
8
9
10
3/4"
TOP AND BOTTOM
SLOT
3/4"
3/32"
1 1/4"
1 3/8"
1 5/16"
1 13/32"
1 25/32"
1 1/2"
1 15/32"
1 19/32"
1 15/16"
1 1/16"
SIDES 2 REQUIRED
5/8"
2 7/16"
13/16"
1 1/16"
11 11/16"
MARK BULKHEAD STATIONS ON ALL PIECES
BEND HERE
13 5/8"

FIG. 2 - TUBE - FORM FROM 1/32" SHEET BALSA CUT TO ABOVE PLANS

A 7-inch Paulownia propeller is specified and recommended. A pair of one-inch maple wheels and a celluloid spinner may also be purchased. The nose piece may be carved from soft balsa or purchased neatly formed in celluloid.

In certain instances full size drawings have been included with this article. In this case all that is necessary is to take off the drawings by tracing carefully and transferring them to the balsa. The wings, tail and rudder should be drawn up full size so that you have something to work over.

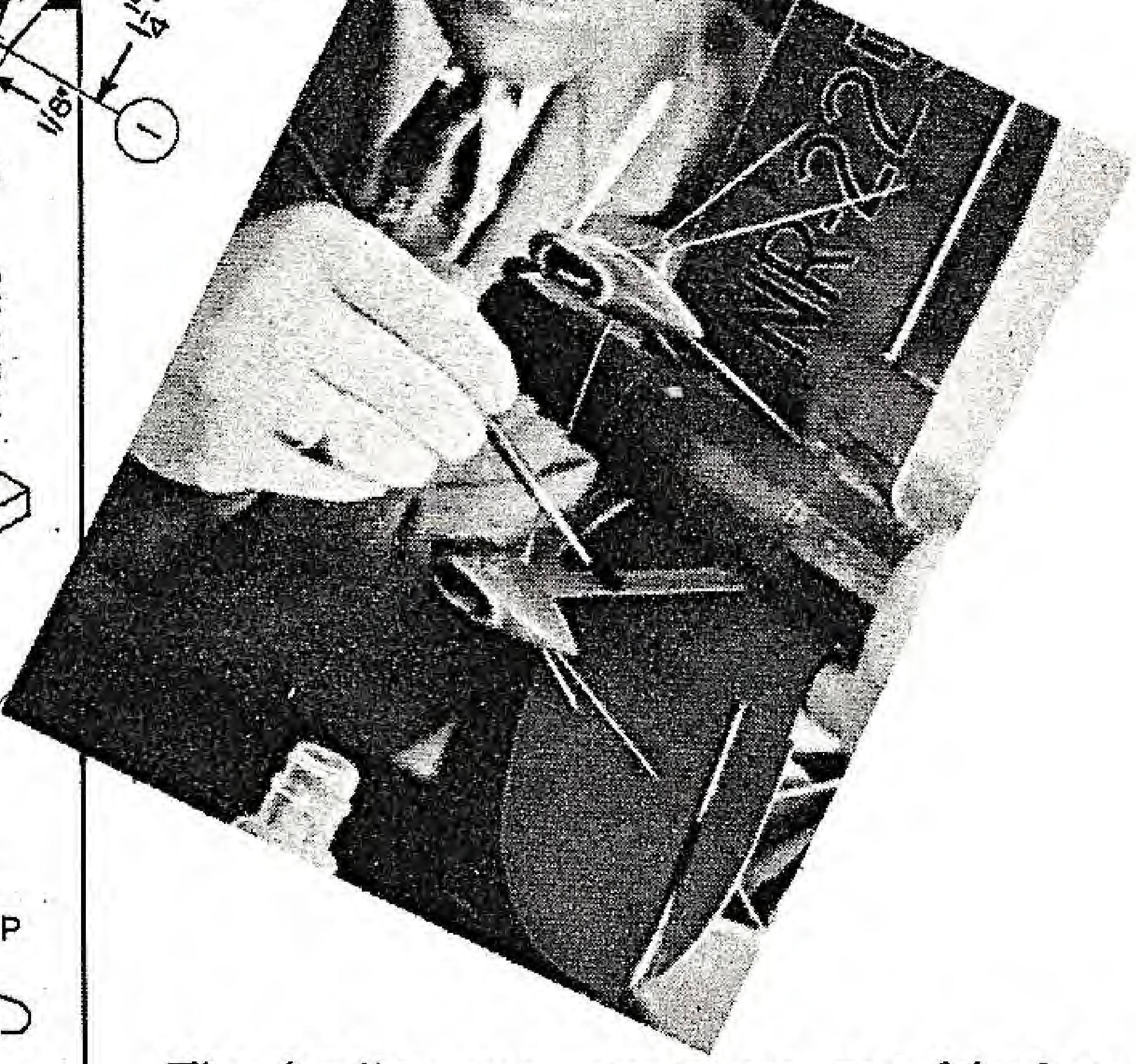
The whole model is built around a central rectangular tube built of $\frac{1}{32}$″ sheet balsa. To this tube are assembled 10 bulkheads and the whole unit is further stiffened by the addition of a keel. The tube, or box girder to be exact, serves to properly align all major parts of the model. It also serves to take the direct thrust and twist of the rubber motor, as well as protecting the model from damage in the event of rubber breakages. It keeps the



TUBE LINE
1/4"
1 15/16"
10
19/32"
9
1 15/32"
8
1 1/2"
7
1 25/32"
6
1 13/32"
5
1 5/16"
3 4
3/8"
2
1/4"
1
1/8"
1/8"
1 5/16"
2 11/16"
1 3/16"
7/32"
1 5/16"
17/32"
3/8"
1 11/16"
3 1/8"
13/32"
25/32"
13 5/8"
B-1
B-2
B-3
B-4
STIFF PAPER
DETAIL OF BULKHEAD ASSEMBLY

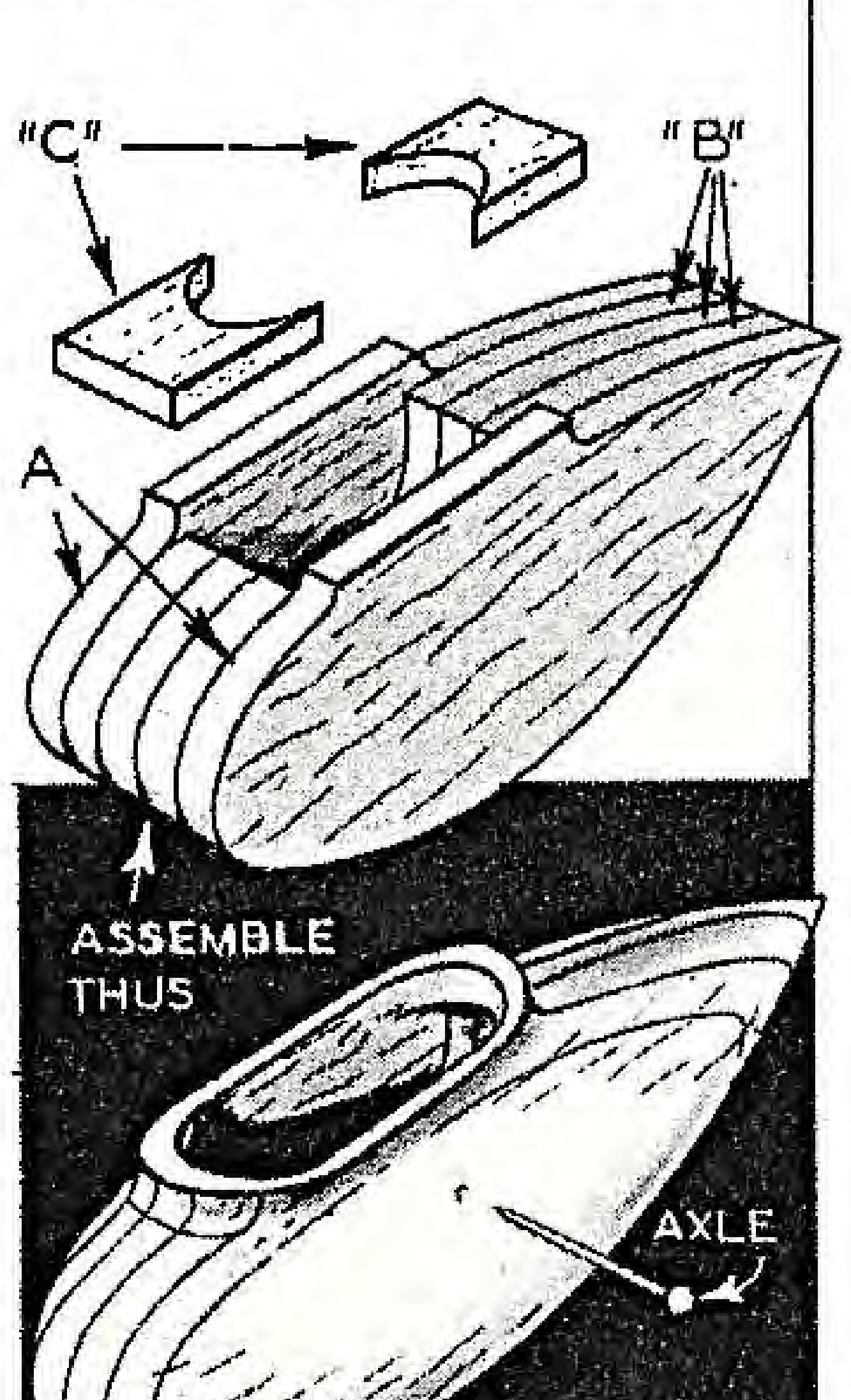
FIG. 3 - KEEL
MAKE ONE THUS OF 1/16" BALSA

Slip the bulkheads on the finished tube and insert roll of paper inside, as shown in the sketch, to hold the tube firmly against the bulkheads while cementing them in place.

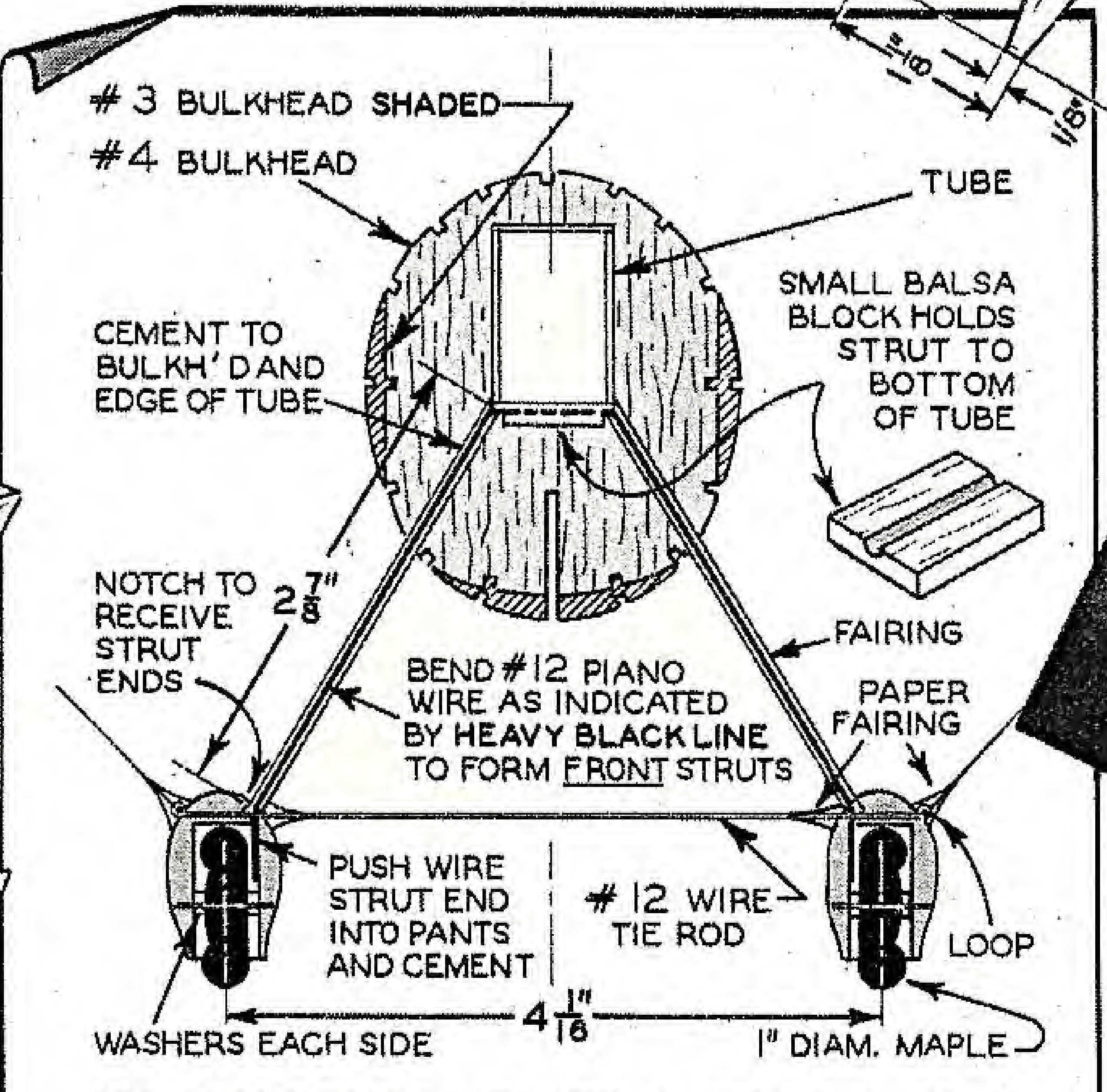


The landing gear struts are not faired to streamline shape until after assembly. Above photo shows final finish of tissue cement or dope being applied to obtain a high gloss.

After cutting out wheel pants pieces, assemble and glue together as shown. To finish, carve carefully to streamline form and sand smooth.

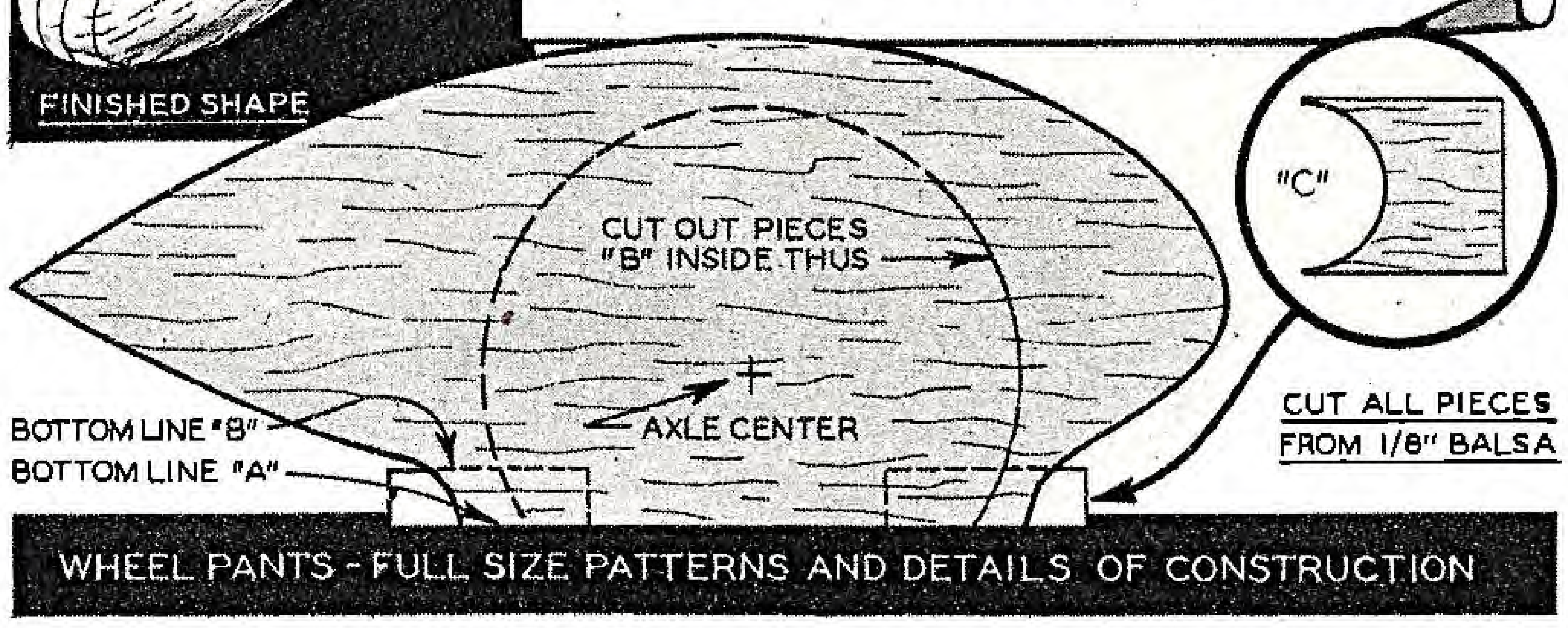


"C"
"B"
A
ASSEMBLE THUS
AXLE
FINISHED SHAPE



#3 BULKHEAD SHADED
#4 BULKHEAD
TUBE
CEMENT TO BULKH'D AND EDGE OF TUBE
SMALL BALSA BLOCK HOLDS STRUT TO BOTTOM OF TUBE
NOTCH TO RECEIVE STRUT ENDS
2 7/8"
FAIRING
BEND #12 PIANO WIRE AS INDICATED BY HEAVY BLACK LINE TO FORM FRONT STRUTS
PAPER FAIRING
PUSH WIRE STRUT END INTO PANTS AND CEMENT
#12 WIRE TIE ROD
LOOP
WASHERS EACH SIDE
4 1/16"
1" DIAM. MAPLE

FIG. 4 - SECTION IMMEDIATELY AFT OF No. 4 BULKHEAD SHOWING LANDING GEAR DETAIL

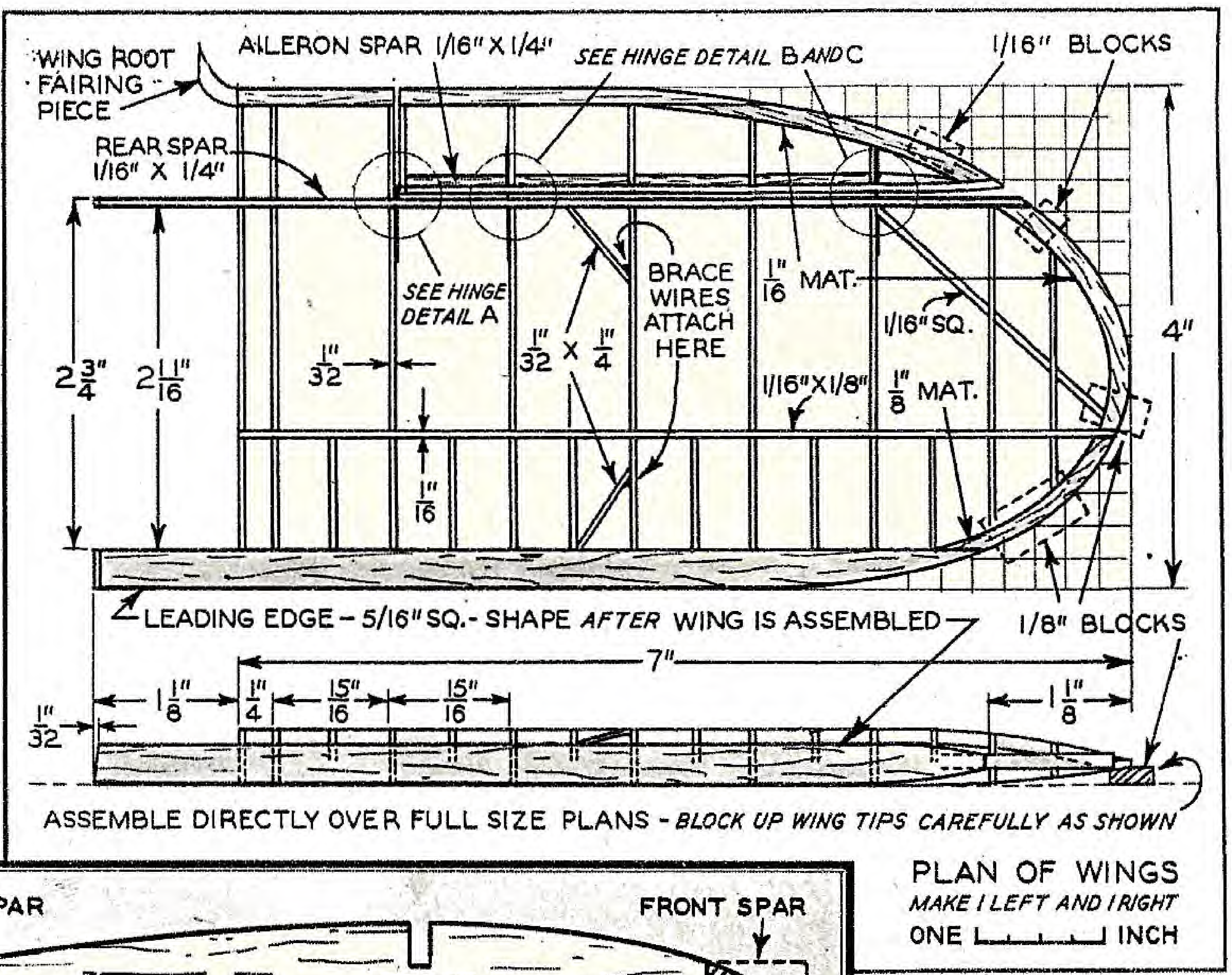


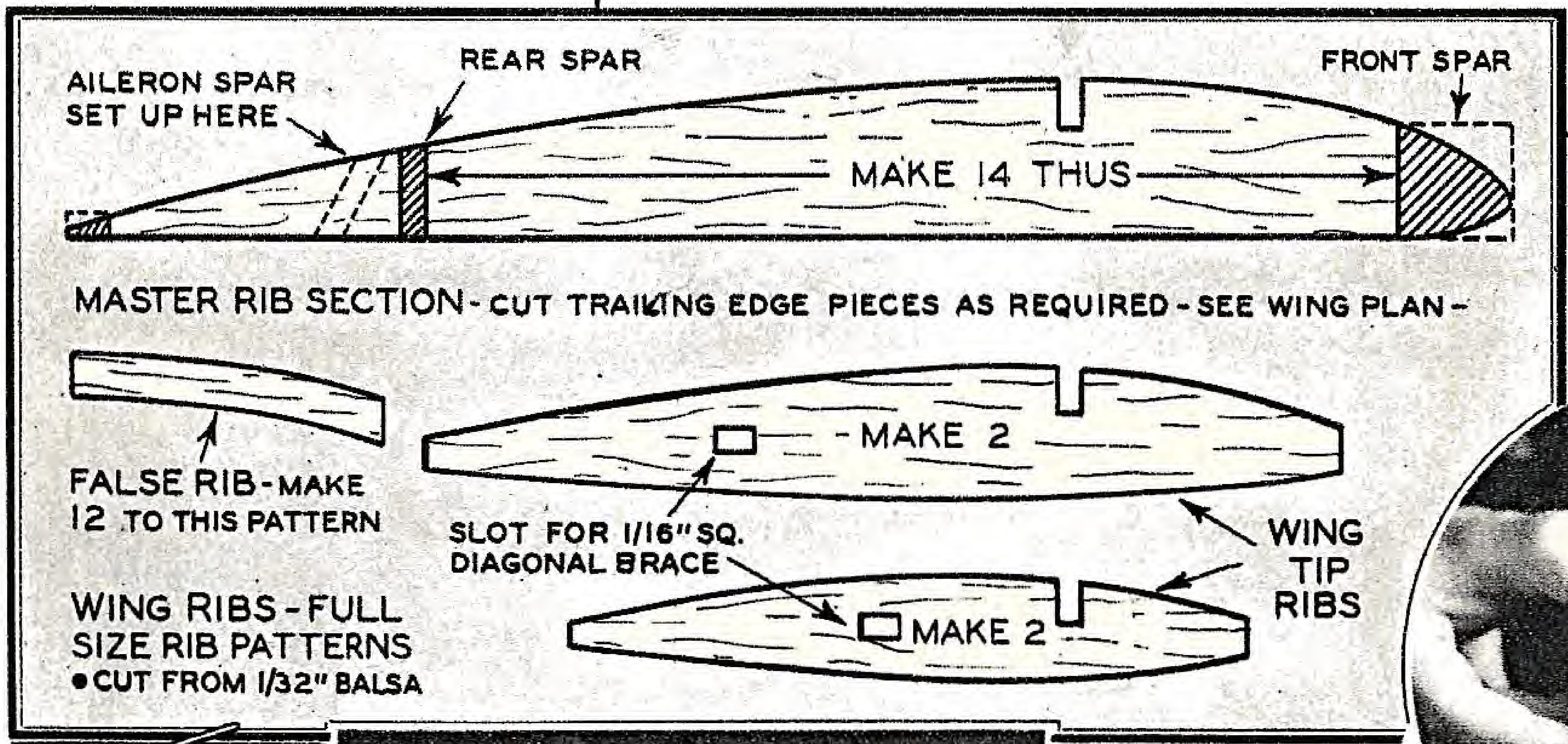
"C"
CUT OUT PIECES "B" INSIDE THUS
AXLE CENTER
BOTTOM LINE "B"
BOTTOM LINE "A"
CUT ALL PIECES FROM 1/8" BALSA

WHEEL PANTS - FULL SIZE PATTERNS AND DETAILS OF CONSTRUCTION

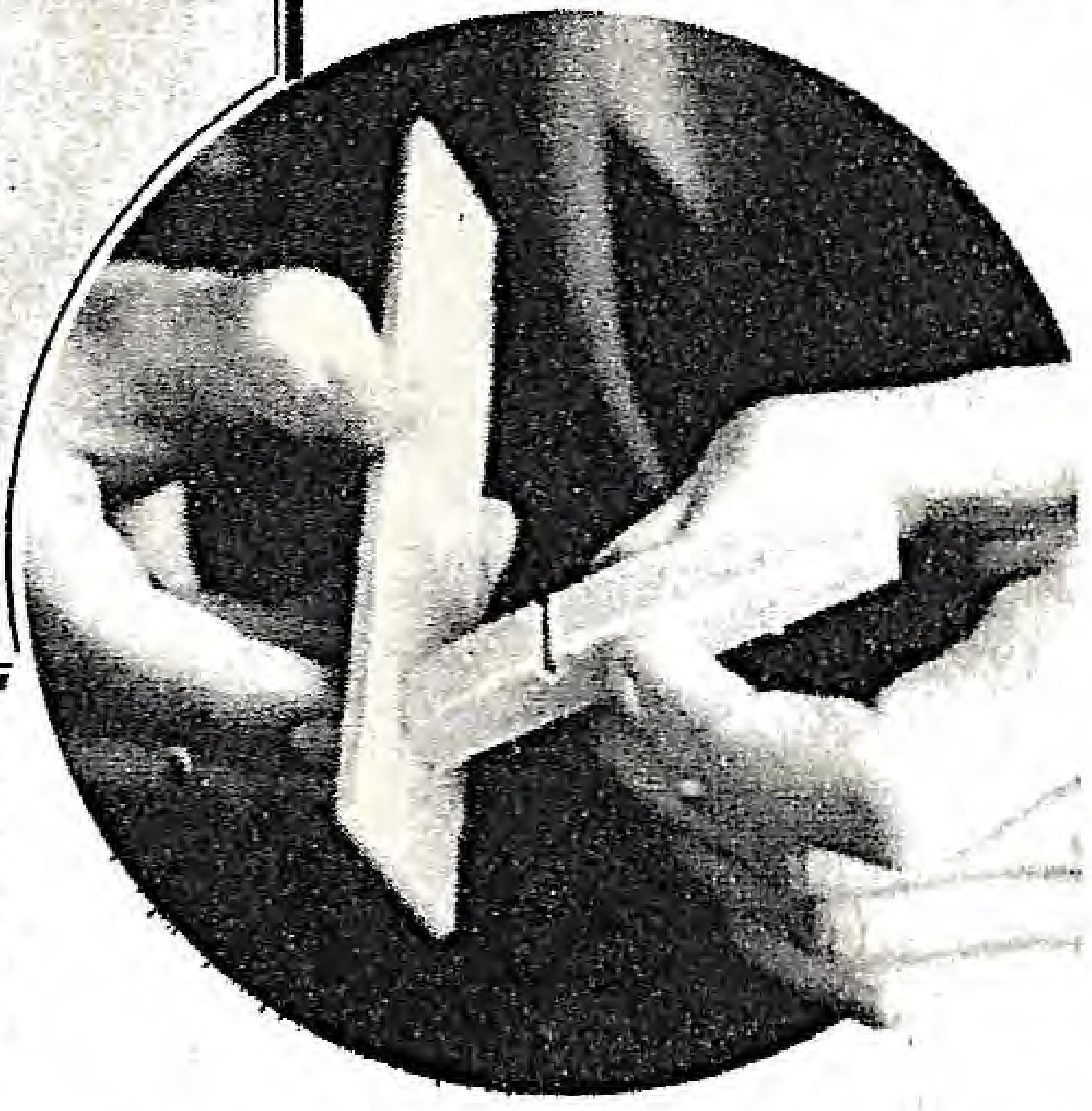
WING and TAIL CONSTRUCTION COVERED in DETAIL

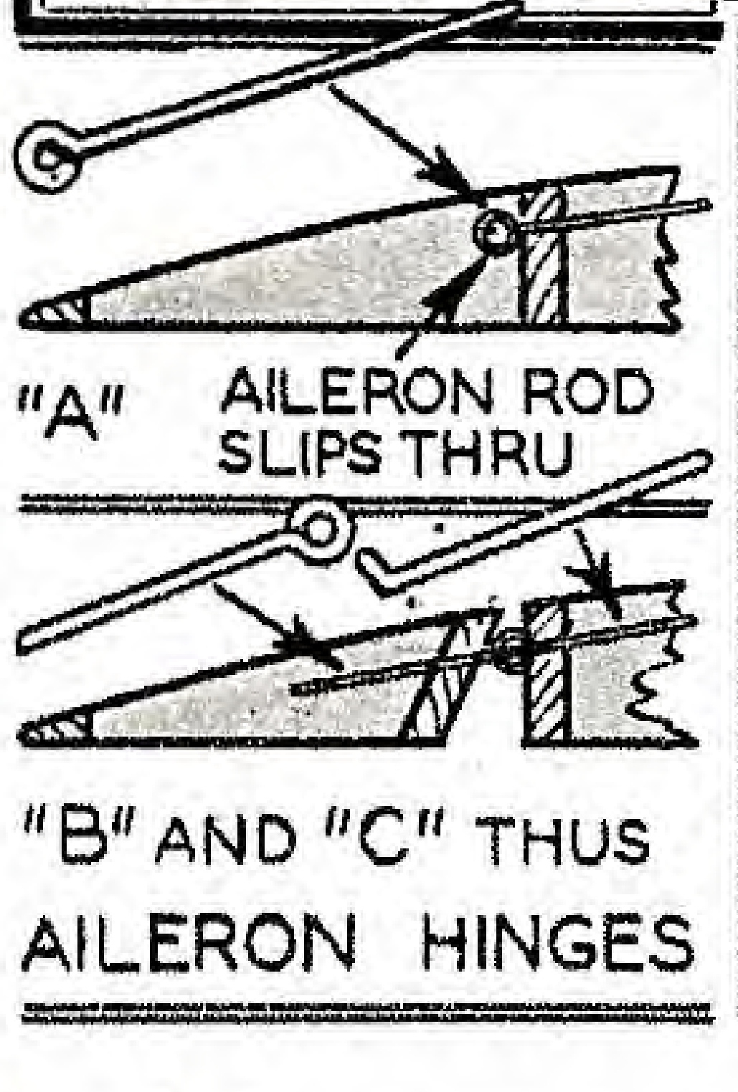
Gluing in the angle braces used to strengthen wing ribs at points of attachment for the bracing wires. Leading edge has been sanded and wing is ready for covering.

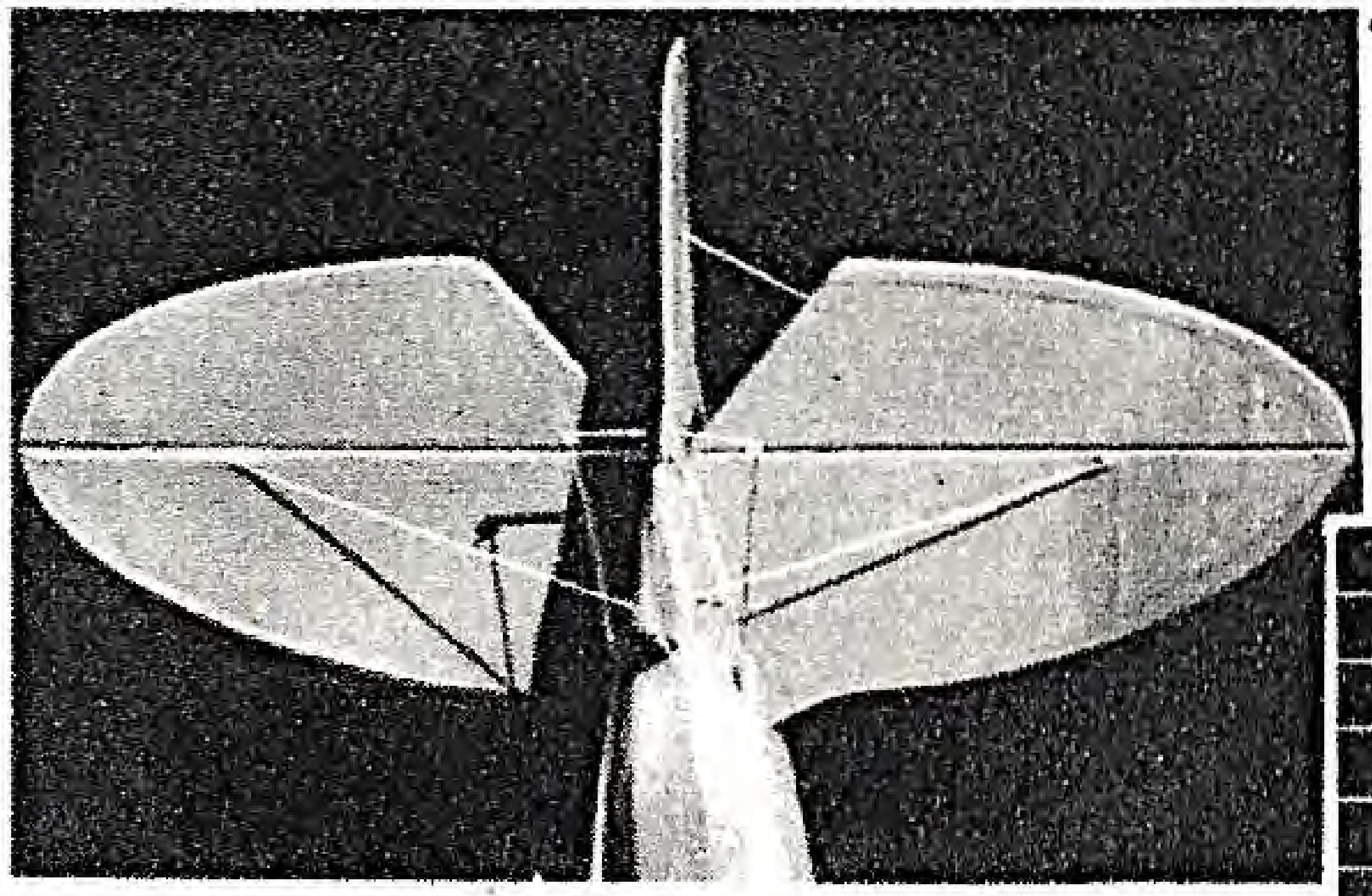

WING ROOT FAIRING PIECE
AILERON SPAR 1/16" X 1/4"
SEE HINGE DETAIL B AND C
1/16" BLOCKS
REAR SPAR 1/16" X 1/4"
SEE HINGE DETAIL A
BRACE WIRES ATTACH HERE
1/16" MAT.
1/16" SQ.
1/16" X 1/8"
1/8" MAT.
1/32" X 1/4"
1/32"
1/16"
2 3/4"
2 11/16"
4"
LEADING EDGE - 5/16" SQ. - SHAPE AFTER WING IS ASSEMBLED
1/8" BLOCKS
7"
1 1/8"
1/4"
15/16"
15/16"
1 1/8"
1/32"
ASSEMBLE DIRECTLY OVER FULL SIZE PLANS - BLOCK UP WING TIPS CAREFULLY AS SHOWN
PLAN OF WINGS
MAKE 1 LEFT AND 1 RIGHT
ONE INCH


AILERON SPAR SET UP HERE
REAR SPAR
FRONT SPAR
MAKE 14 THUS
MASTER RIB SECTION - CUT TRAILING EDGE PIECES AS REQUIRED - SEE WING PLAN -
FALSE RIB - MAKE 12 TO THIS PATTERN
MAKE 2
SLOT FOR 1/16" SQ. DIAGONAL BRACE
MAKE 2
WING TIP RIBS
WING RIBS - FULL SIZE RIB PATTERNS
• CUT FROM 1/32" BALSA

Follow the wing plans above, using full-size rib patterns shown at left. Below — Correct method of finishing the ribs. Pin ribs together.




"A"
AILERON ROD SLIPS THRU
"B" AND "C" THUS
AILERON HINGES

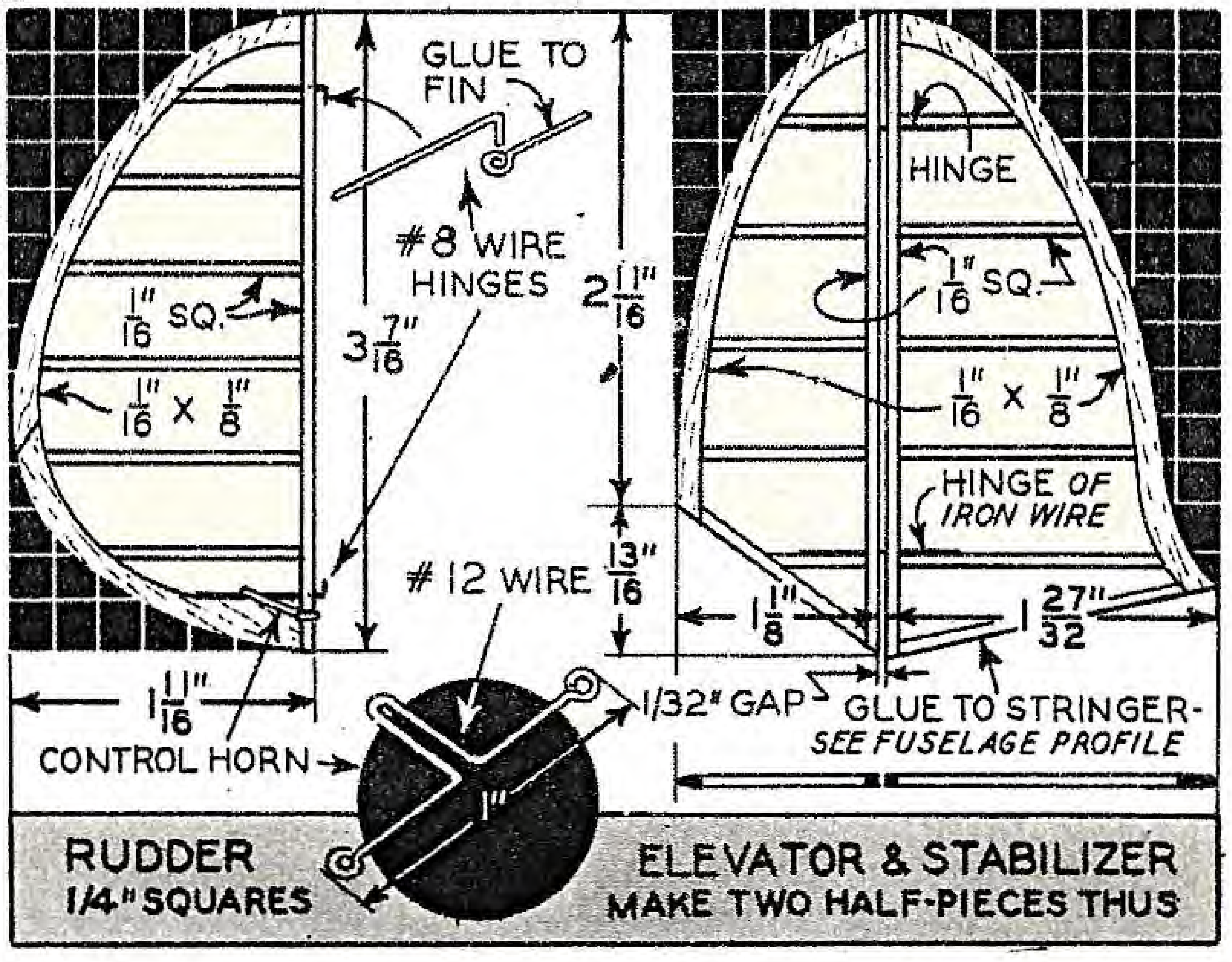


Left—View of completed tail. Note control horns. The wire at left is dummy to add realism.

model from getting spattered by the rubber lubricant and, above all, it is the basis of the truss which forms the backbone of the model and to which all important parts, such as wing, landing gear, etc., are fastened.

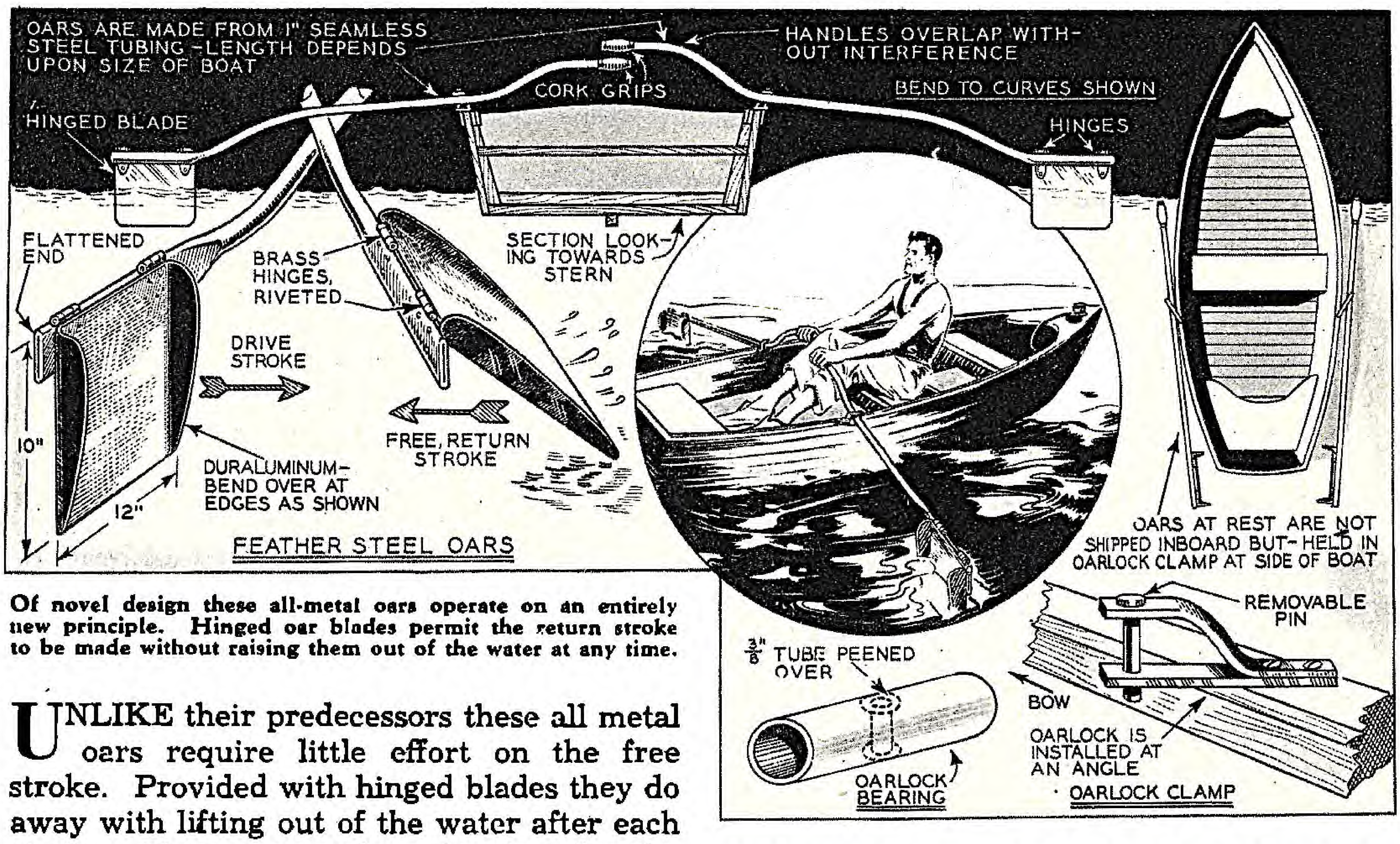
Build the tube first. All drawings covering the tube, keel and bulkheads are covered in Figures 1 to 4. Cut out the tube pieces accurately and glue together so that the completed tube is true. Use a straight edge during the operation, aligning edge of side piece along edge of bottom piece and then

[*Continued on page* 124]


GLUE TO FIN
#8 WIRE HINGES
HINGE
1/16" SQ.
1/16" X 1/8"
3 7/16"
2 11/16"
1/16" SQ.
1/16" X 1/8"
HINGE OF IRON WIRE
#12 WIRE
13/16"
1 1/8"
1 27/32"
1 11/16"
1/32" GAP
GLUE TO STRINGER - SEE FUSELAGE PROFILE
CONTROL HORN
1"
RUDDER
1/4" SQUARES
ELEVATOR & STABILIZER
MAKE TWO HALF-PIECES THUS

Using 1/4" squares make full size drawing of elevator and stabilizer. Fasten wire control horn to lower part of rudder as shown in the detail sketch on page 105.

METAL OARS SIMPLIFY BOAT ROWING

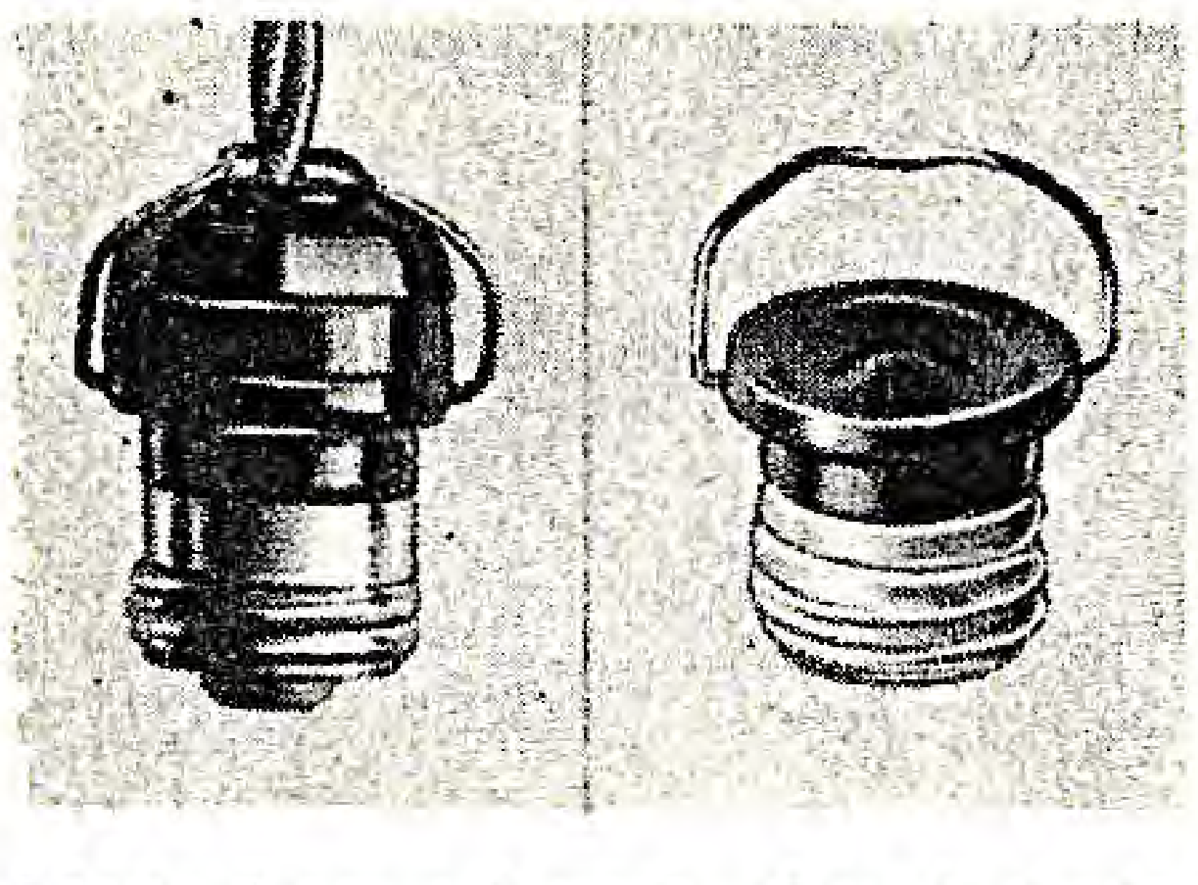

OARS ARE MADE FROM 1" SEAMLESS STEEL TUBING - LENGTH DEPENDS UPON SIZE OF BOAT
HANDLES OVERLAP WITHOUT INTERFERENCE
CORK GRIPS
BEND TO CURVES SHOWN
HINGED BLADE
HINGES
FLATTENED END
BRASS HINGES, RIVETED
SECTION LOOKING TOWARDS STERN
DRIVE STROKE
FREE, RETURN STROKE
10"
12"
DURALUMINUM- BEND OVER AT EDGES AS SHOWN
FEATHER STEEL OARS
OARS AT REST ARE NOT SHIPPED INBOARD BUT- HELD IN OARLOCK CLAMP AT SIDE OF BOAT
REMOVABLE PIN
3/8" TUBE PEENED OVER
BOW
OARLOCK IS INSTALLED AT AN ANGLE
OARLOCK BEARING
OARLOCK CLAMP

Of novel design these all-metal oars operate on an entirely new principle. Hinged oar blades permit the return stroke to be made without raising them out of the water at any time.

UNLIKE their predecessors these all metal oars require little effort on the free stroke. Provided with hinged blades they do away with lifting out of the water after each stroke. They are much easier, too, for the inexperienced to handle since the cork handle grips make it impossible to pinch the fingers.

The oars are constructed of seamless steel tubing 1 inch in diameter and bent to the form shown. Their length depends upon the boat on which they will be used. Flatten the ends of the tubing and attach the duraluminum blades with hinges. The oar locks are constructed of strap iron as illustrated.

Clip Holds Fixture Plugs Together



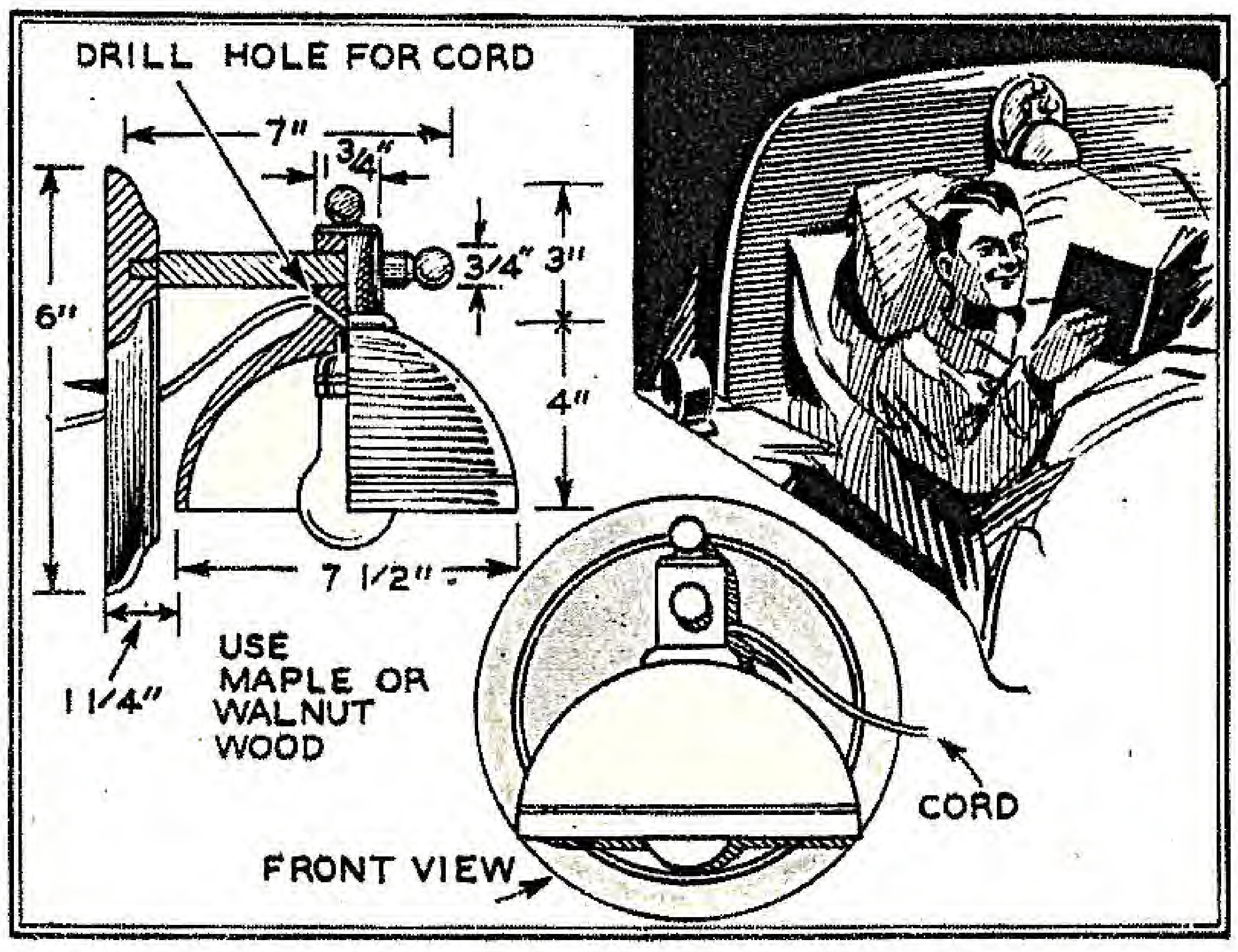
Made from a length of spring wire this simple clip holds the two sections of a light plug together.

A SIMPLE wire clip attached to the threaded portion of a light fixture plug prevents it from coming loose, accidentally, from the other half. The clip is especially useful when the plug connects to an overhead socket and is continually dropping out. Once locked, sections remain together.

Secure a length of spring wire and bend it into the shape shown in the photograph. Drill a small hole, large enough for the spring wire, in each side of the plug, insert the clip and the plug is ready for use.

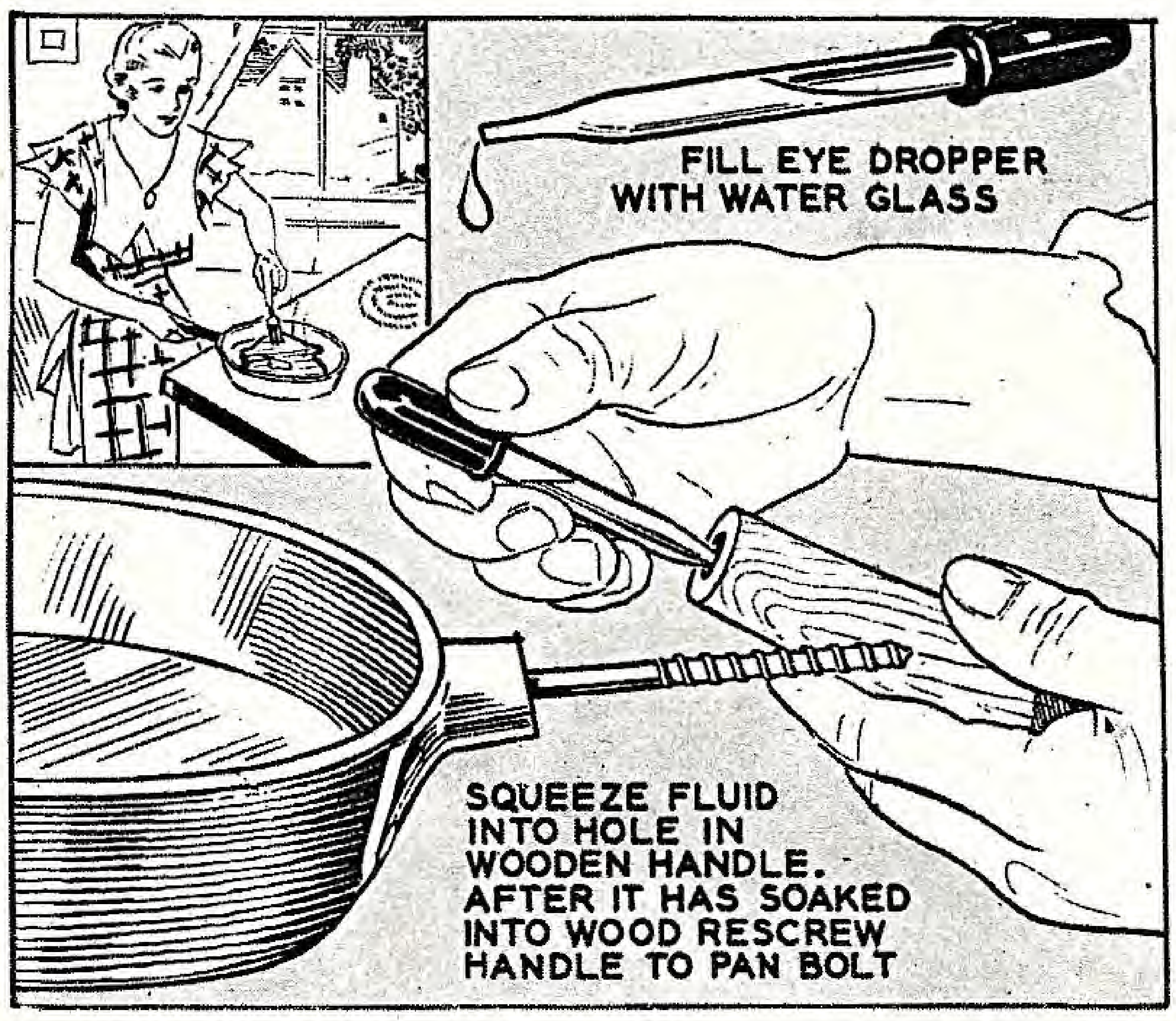
Colonial Lamp Is Novel Lathe Job

FASTENED to the head of your bed this easily made Colonial bed lamp will prove its worth in a very short time. The lamp is a simple lathe project that may be turned from either maple or walnut. The base is 6" in diameter and 1¼" thick. A wooden dowel ¾" thick supports the shade which, too, is made on the lathe. Turn the shade in the form of a bowl with a decorative groove cut around the edge. The completed lamp may be stained or finished in natural color. Wire up with standard fixtures.


DRILL HOLE FOR CORD
7"
3/4"
3/4"
3"
6"
4"
7 1/2"
1 1/4"
USE MAPLE OR WALNUT WOOD
CORD
FRONT VIEW

This attractive Colonial bed lamp can be turned down on any wood lathe. After completing the base, shade and dowel glue them together and wire up lamp in the manner shown above.

NEW IDEAS FOR HOME REPAIR MEN


FILL EYE DROPPER WITH WATER GLASS
SQUEEZE FLUID INTO HOLE IN WOODEN HANDLE. AFTER IT HAS SOAKED INTO WOOD RESCREW HANDLE TO PAN BOLT

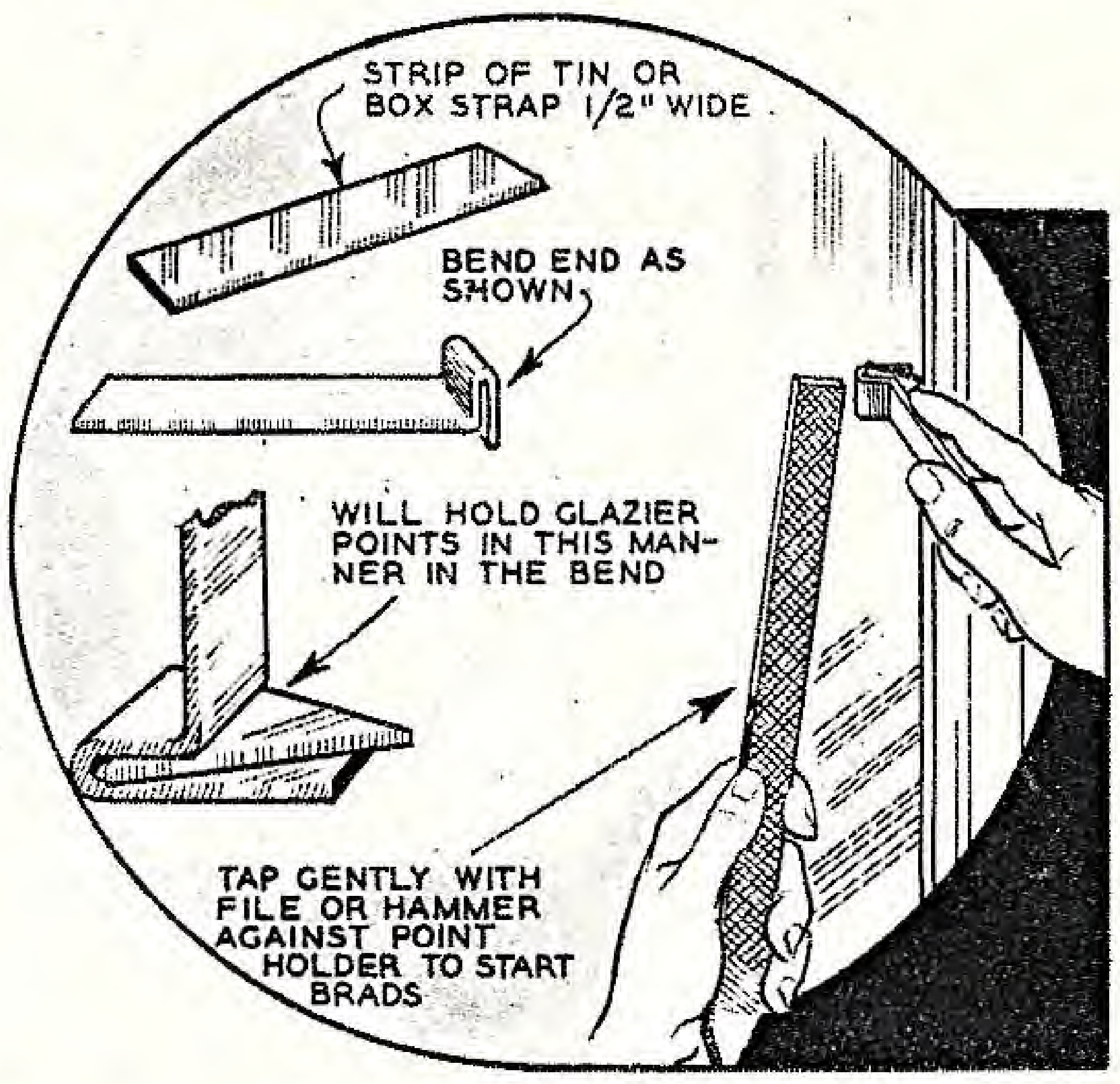
Water Glass Tightens Loose Handles

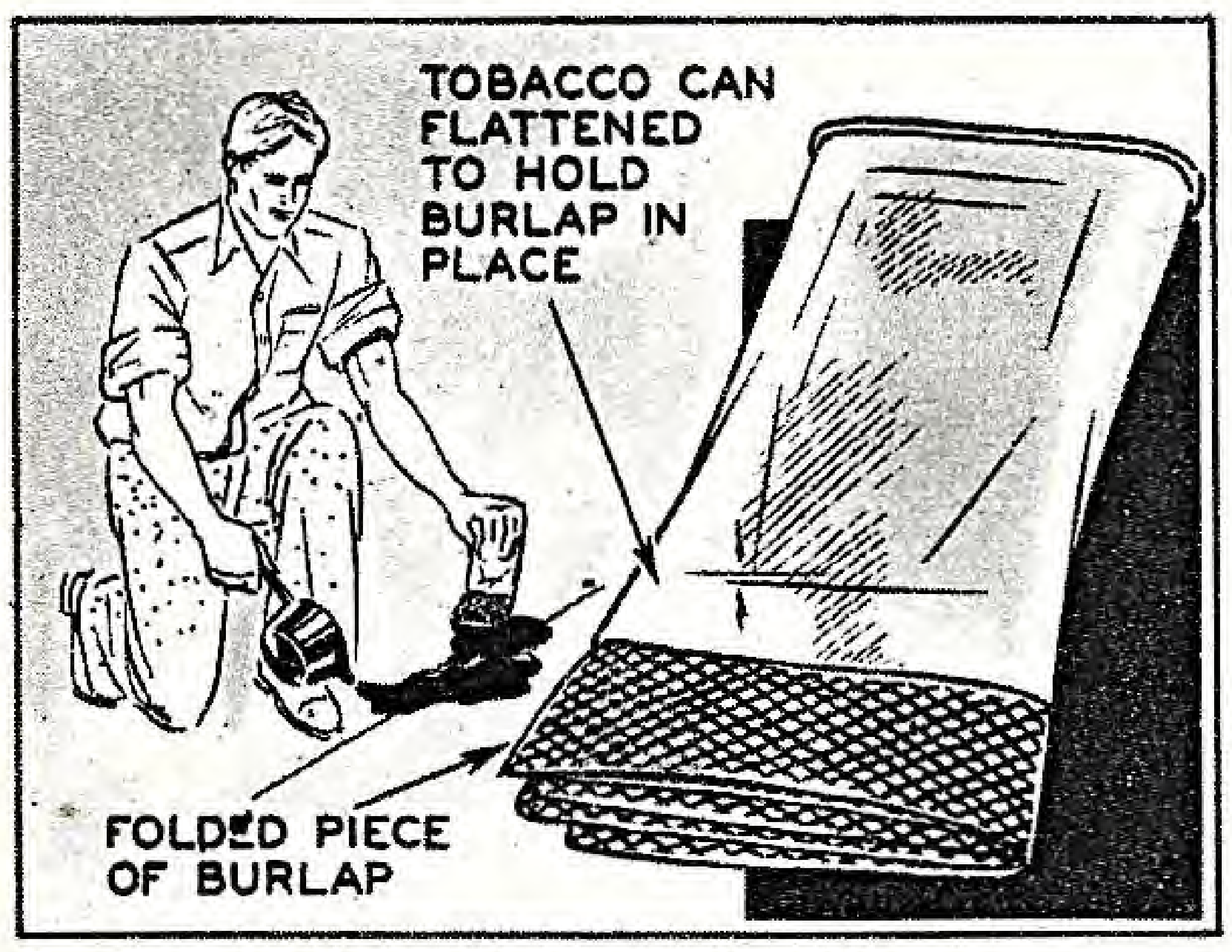
AFTER a frying or cooking pan has been in use for some time the handle generally becomes loose due to the heat of the bolt holding it charring the inside. If the old handle is not burnt too much it is possible to protect it against further charring by filling with water glass, allowing it to soak into the wood.

After the water glass has been allowed to dry the handle may be screwed on to the pan. Not only will it hold well, but it will be free from further charring since the water glass soaking into the wood rendered it fireproof. —Kenneth Murray.

Glazier's Tool Simplifies Glass Mounting

ONE of the most difficult tasks about the home is to insert glaziers points after replacing a broken window pane. Usually it is impossible to hold the tiny triangular brads with the fingers and oftentimes the fingers are struck instead of the brad. To eliminate this inconvenience make a metal holder from a length of sheet metal bending it to the shape shown. If desired spring brass may be used with even better results since it will hold the brads better than will sheet metal. Use a file to drive the brad into the frame.—A. H. Waychoff.


STRIP OF TIN OR BOX STRAP 1/2" WIDE
BEND END AS SHOWN
WILL HOLD GLAZIER POINTS IN THIS MANNER IN THE BEND
TAP GENTLY WITH FILE OR HAMMER AGAINST POINT HOLDER TO START BRADS

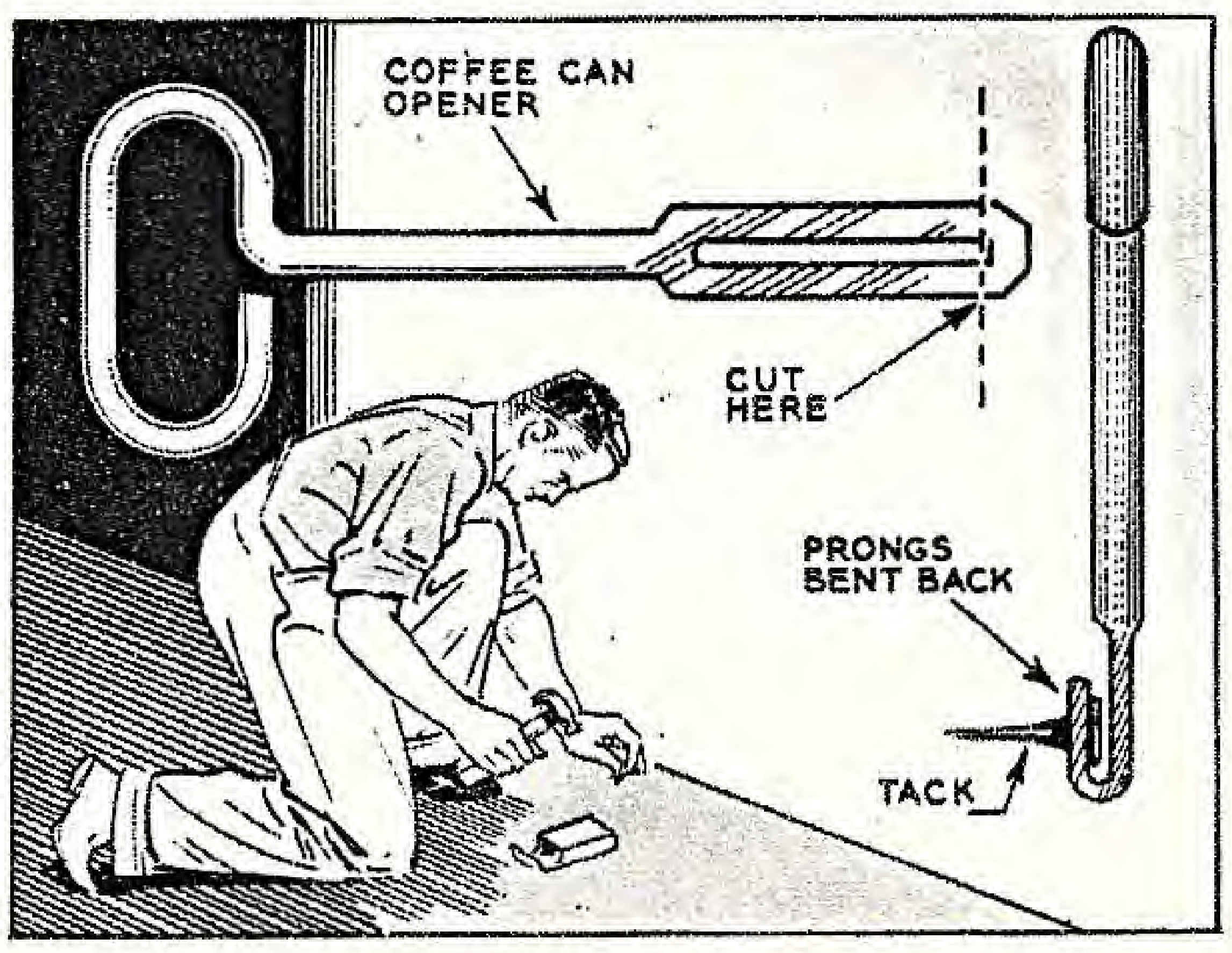

TOBACCO CAN FLATTENED TO HOLD BURLAP IN PLACE
FOLDED PIECE OF BURLAP

Tobacco Can Makes Handy Tar Brush

WHEN small jobs of mending are necessary on an asphalt or paper roof there is no need to ruin a perfectly good bristle brush with the liquid tar. A practical brush for doing this work can be made from a length of burlap or other heavy cloth folded so as to fit snugly in the end of a tobacco can. After inserting the cloth in the can flatten the end so that it cannot work loose. The tin can makes a convenient handle and the burlap swab will spread the tar most efficiently.—G. E. Hendrickson.

Tack Holder Made From Coffee Can Opener

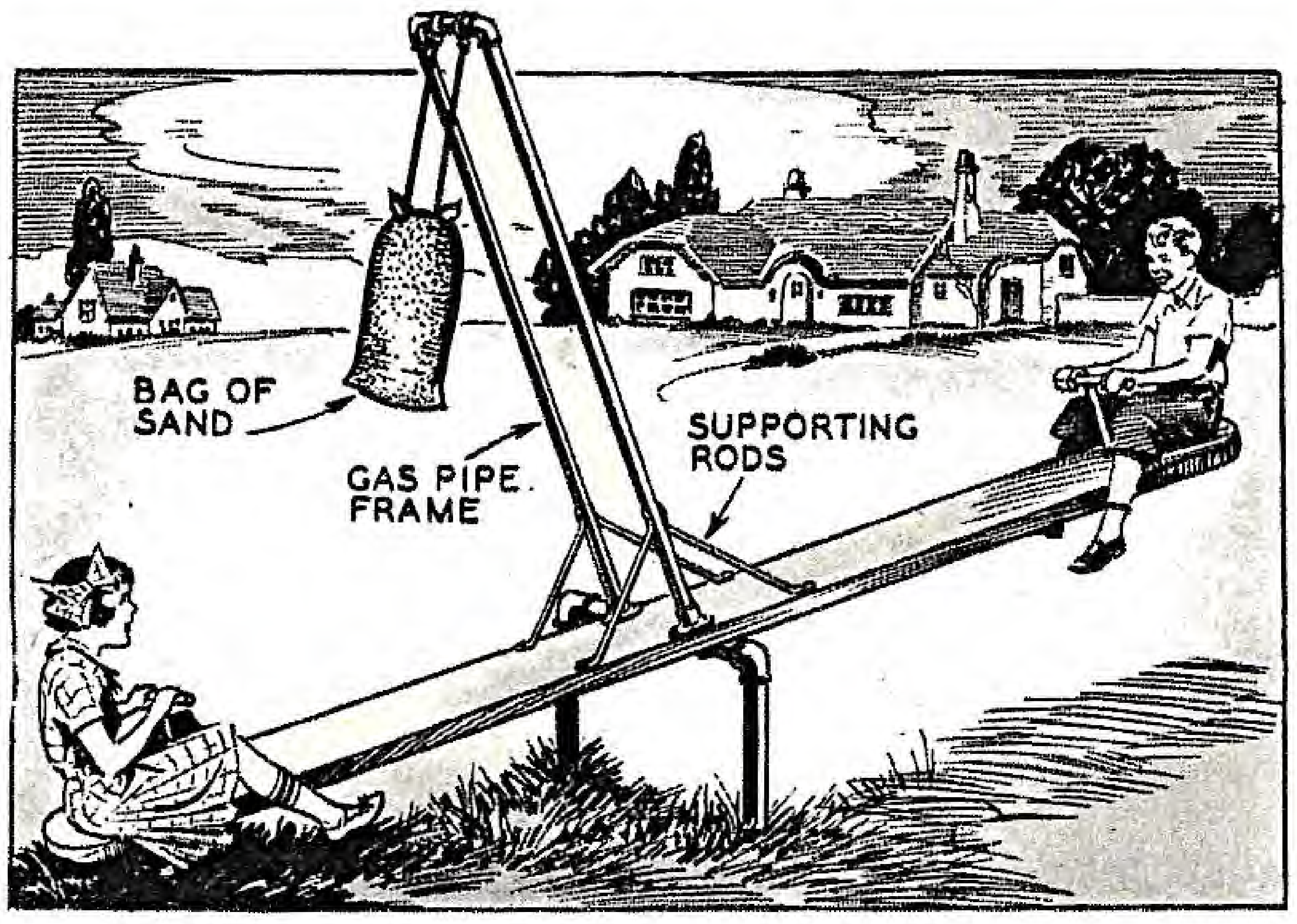
DRIVING small tacks is often a disagreeable task, but this simple tack holder makes it easy to drive tacks even in the most cramped quarters. Secure a key from a vacuum type coffee can and cut off the end in the manner shown then bend it over so that a tack may be slipped between the prongs. The holder will prove very popular with women since tacks may be driven without the common danger of hitting fingers instead. Remove holder before driving tack all the way.—R. Anderson.

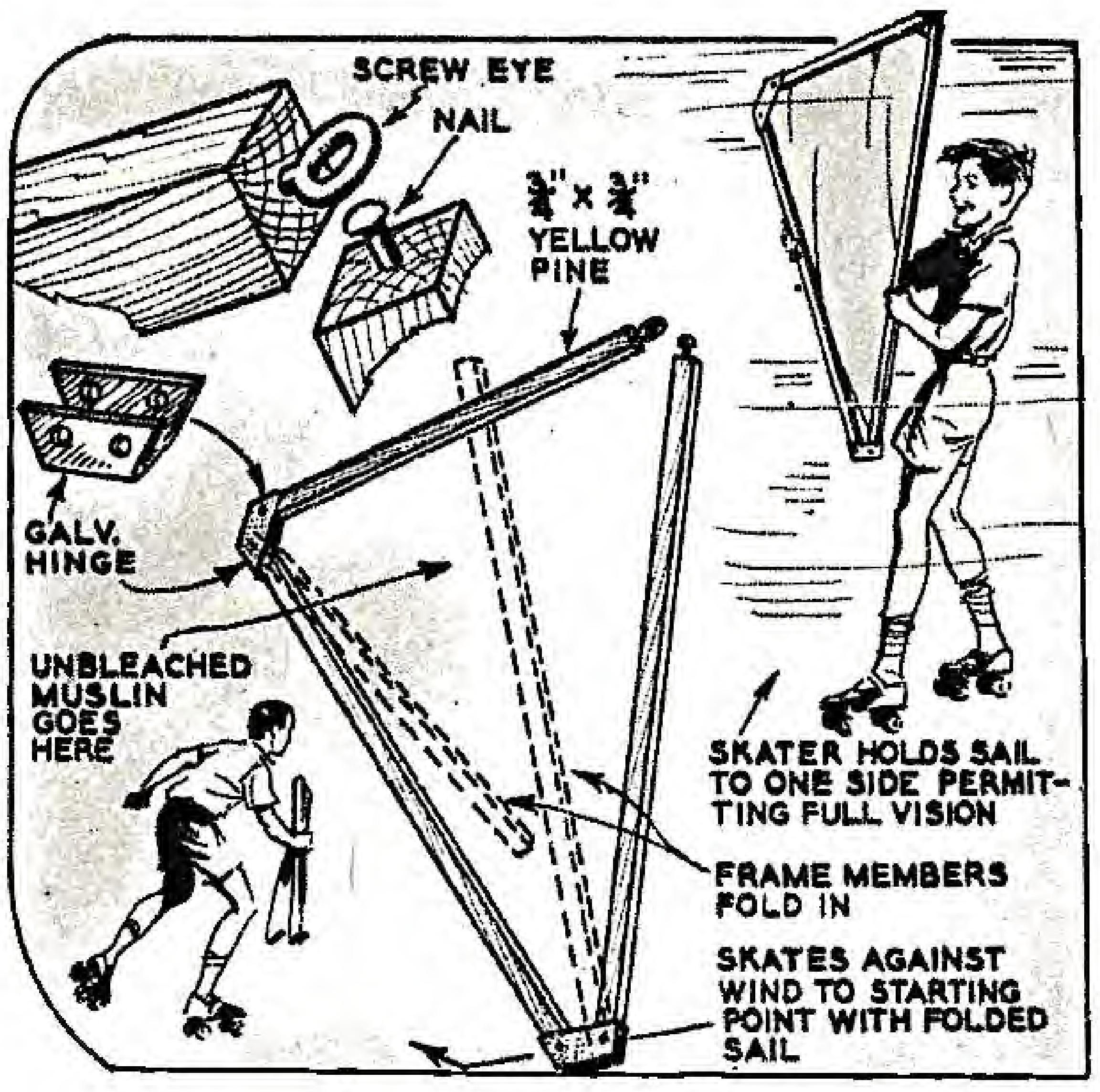

COFFEE CAN OPENER
CUT HERE
PRONGS BENT BACK
TACK

NEW SPORTS FOR ACTIVE YOUTHS

Sand Bag Operates Novel See-Saw

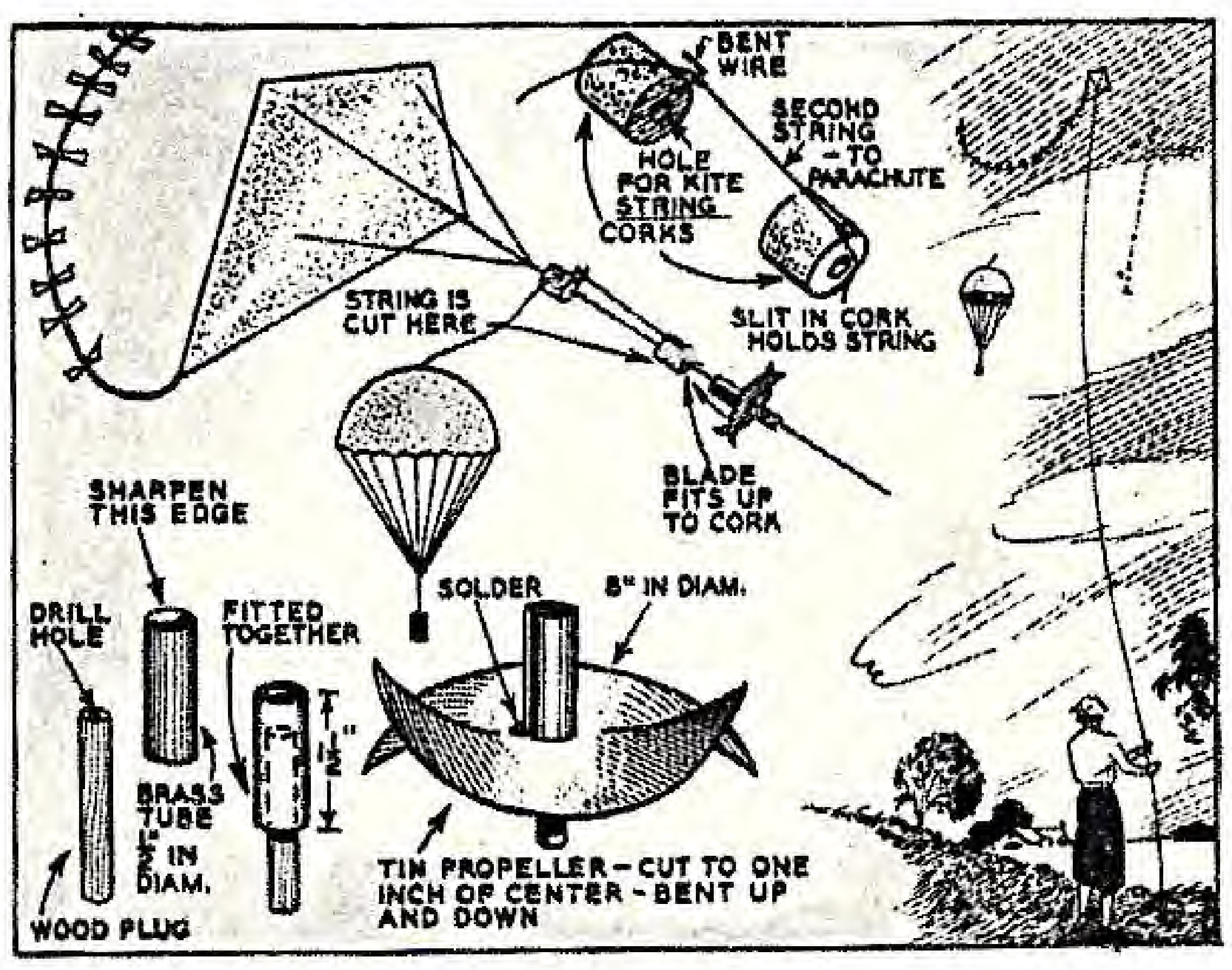
REQUIRING no effort on the part of the riders this novel see-saw can be constructed by any handy man in a few hours. The frames are made from gas or water pipe in the manner shown. The teeter board is of 1¼" stock, 12" wide by 12′ long. These measurements may be altered, though, to meet the particular requirements of the builder. Above the fulcrum mount the frame for the sand bag and attach to it bag containing about 75 pounds of sand.—G. Hendrickson.


BAG OF SAND
GAS PIPE FRAME
SUPPORTING RODS


SCREW EYE
NAIL
¾" x ¾" YELLOW PINE
GALV. HINGE
UNBLEACHED MUSLIN GOES HERE
SKATER HOLDS SAIL TO ONE SIDE PERMITTING FULL VISION
FRAME MEMBERS FOLD IN
SKATES AGAINST WIND TO STARTING POINT WITH FOLDED SAIL

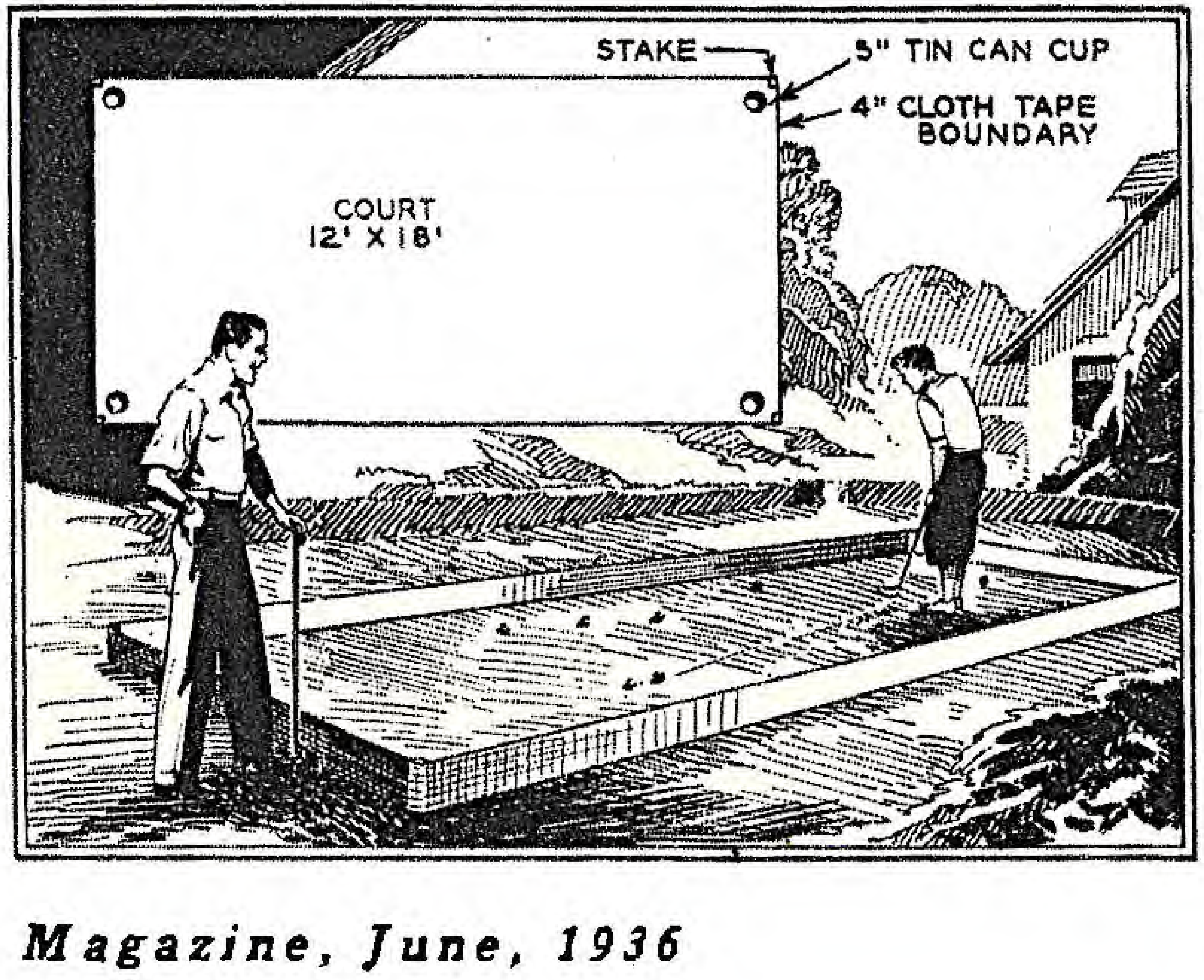
Sail Adds New Thrills To Roller Skating

A SIMPLE folding sail will add to the thrills of youthful roller skaters, carrying them along with the wind at a lively gate. The sail is made from several lengths of ¾"x¾" white pine joined together with simple metal hinges permitting it to be folded up like an umbrella when skating against the wind. The sail need not be of any definite size; this being determined by the person who will use it. Cover the wooden frame with unbleached muslin using tacks with large heads to hold it in place. A screw eye attached to the open end of the frame permits it to be folded —Hi Sibley.


BENT WIRE
SECOND STRING – TO PARACHUTE
HOLE FOR KITE STRING
CORKS
STRING IS CUT HERE
SLIT IN CORK HOLDS STRING
BLADE FITS UP TO CORK
SHARPEN THIS EDGE
DRILL HOLE
FITTED TOGETHER
SOLDER
8" IN DIAM.
1½"
BRASS TUBE ½" IN DIAM.
WOOD PLUG
TIN PROPELLER – CUT TO ONE INCH OF CENTER – BENT UP AND DOWN

Gyro Kite Drops Parachute From the Sky

PARACHUTES drop from the sky with this simple gyro. Grind an edge on a piece of brass tubing, solder on a tin propeller and force a hollow wooden rod into it. Make a parachute from tissue and support to kite with thread and corks. The propeller, threaded on kite string, spins to top releasing parachute.—L. Bastin.


STAKE
5" TIN CAN CUP
4" CLOTH TAPE BOUNDARY
COURT 12' X 18'

Play Billiards On Backyard Lawn

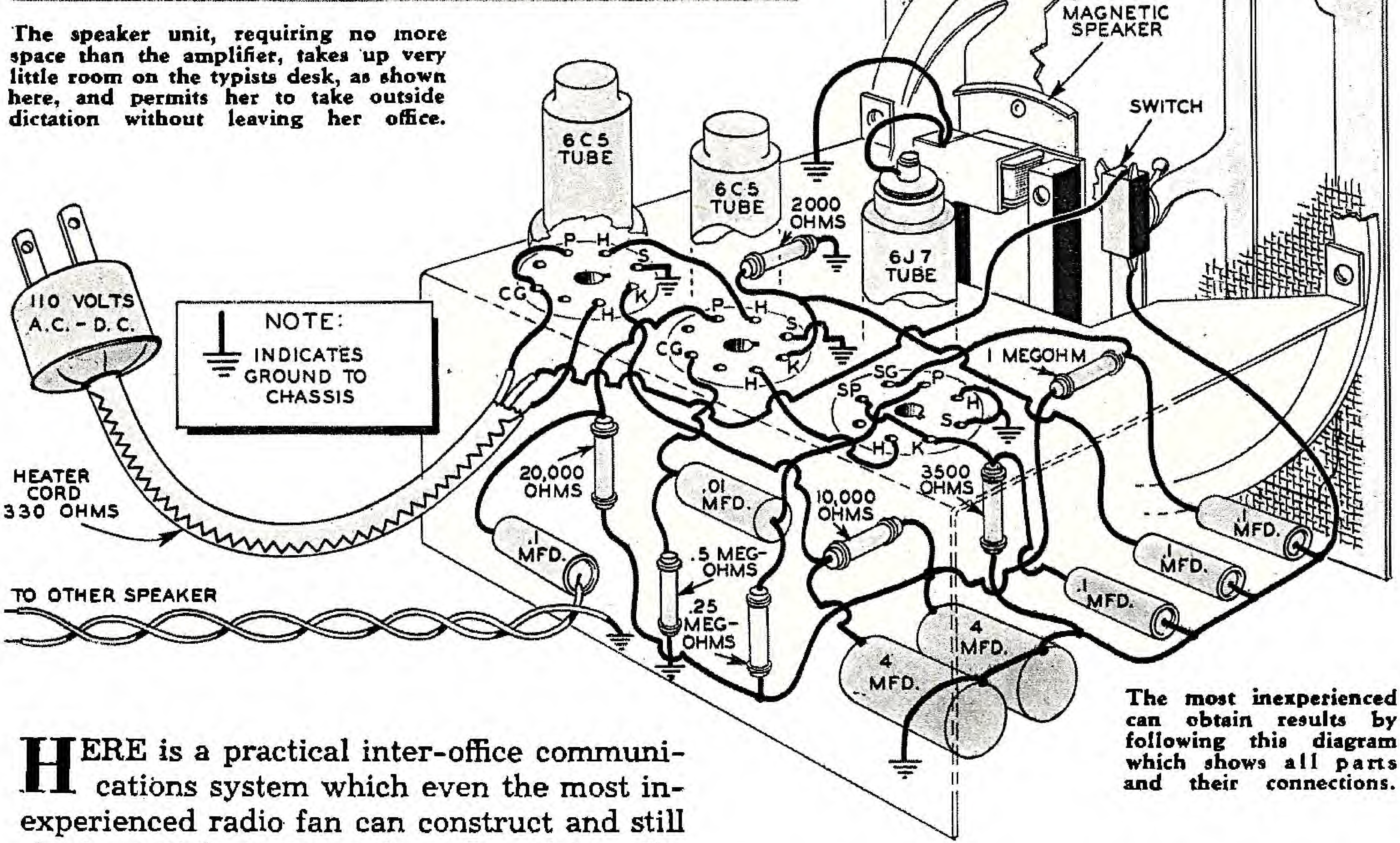
A PAIR of golf putters and a dozen old golf balls painted from 1 to 10 with the remaining two painted black are the only accessories needed to play this interesting lawn billiards game. Lay off the court so that it measures 12′x18′ using cloth from old flour sacks for the back stops. Tin cans are inserted in each corner and a 2′ ring for the balls marked in the center. The game is played in the regulation manner using the putters instead of cues. The game incorporates features of golf and billiards.—E. Van Horn.

A Midget Public Address

The speaker unit, requiring no more space than the amplifier, takes up very little room on the typists desk, as shown here, and permits her to take outside dictation without leaving her office.

by E. N. HARGRAVE

This tiny portable inter-office communications system permits distant conversation between rooms or offices. The device costs only a few dollars to make.


MAGNETIC SPEAKER
SWITCH
6C5 TUBE
6C5 TUBE
2000 OHMS
6J7 TUBE
P
H
S
CG
K
H
SG
SP
NOTE: INDICATES GROUND TO CHASSIS
110 VOLTS A.C.-D.C.
HEATER CORD 330 OHMS
TO OTHER SPEAKER
20,000 OHMS
.1 MFD.
.01 MFD.
.5 MEG-OHMS
.25 MEG-OHMS
10,000 OHMS
3500 OHMS
1 MEGOHM
.1 MFD.
.1 MFD.
.1 MFD.
4 MFD.
4 MFD.

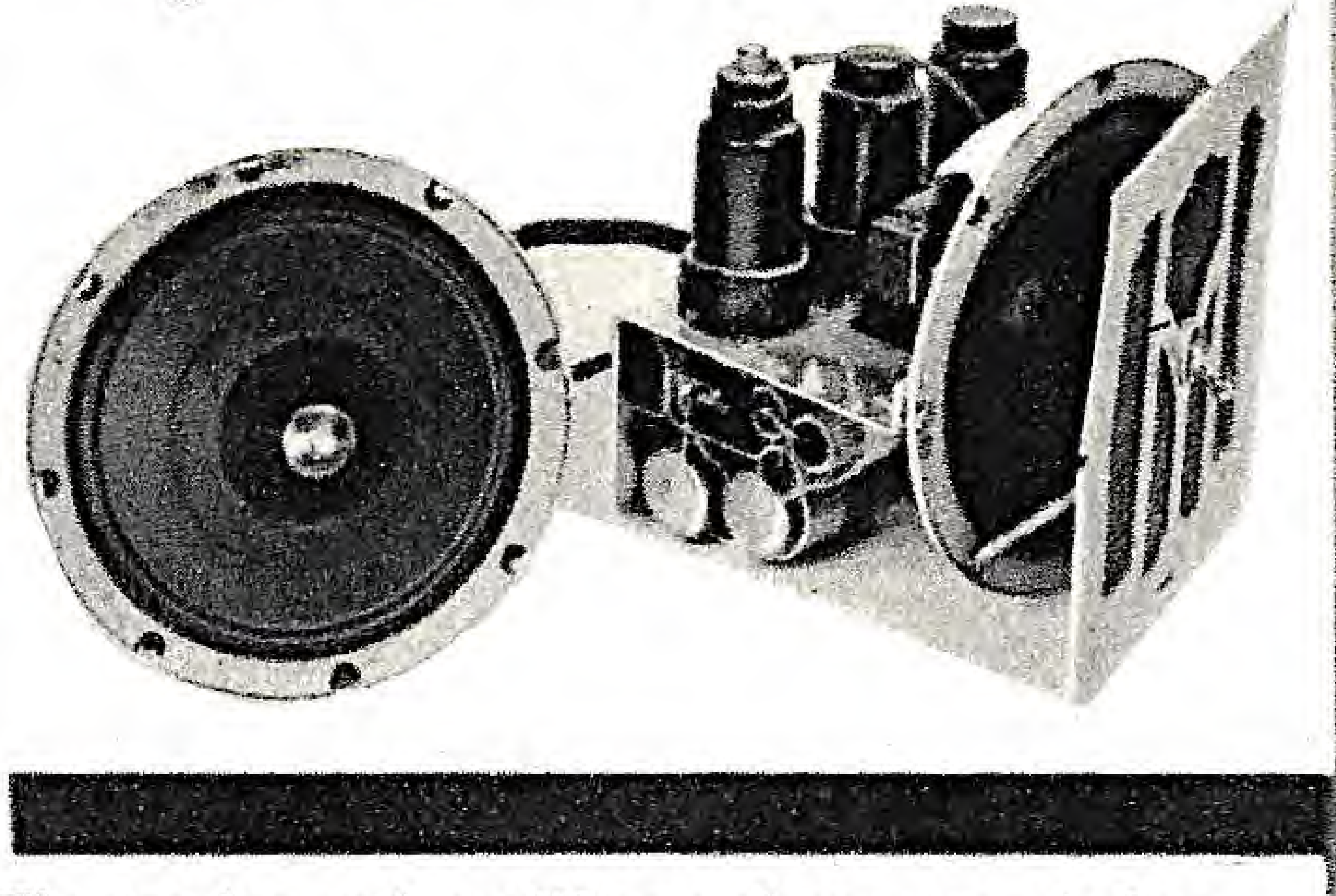
The most inexperienced can obtain results by following this diagram which shows all parts and their connections.

HERE is a practical inter-office communications system which even the most inexperienced radio fan can construct and still obtain satisfactory results. In wiring the device, which is extremely simple, it is only necessary to follow the pictorial diagram. The parts used in the construction can be purchased at a cost not exceeding $11 from any radio supply house.

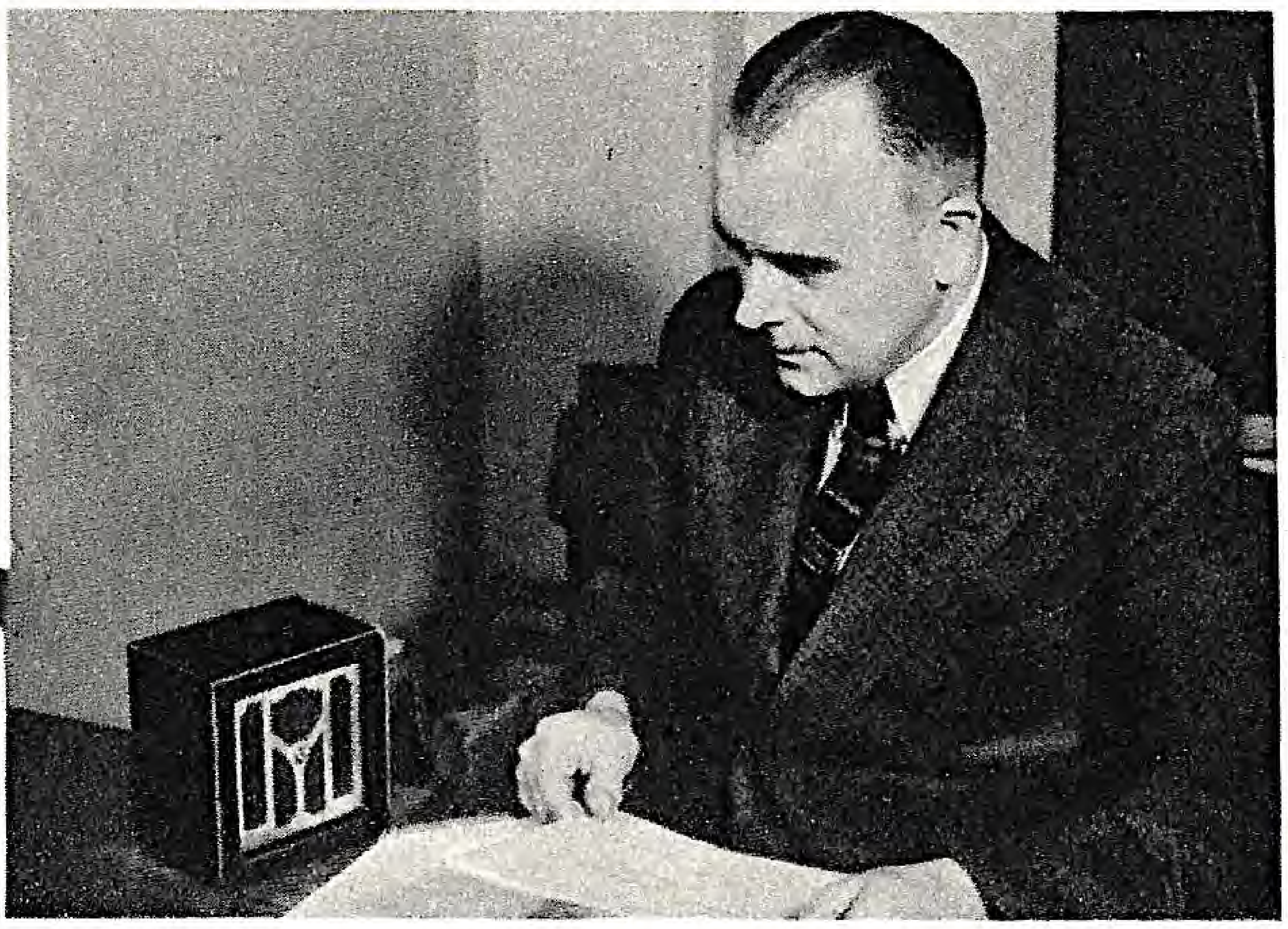
No microphones are required with this device since a speaker, operating on the reverse current principle, is employed. For this reason two speakers are used in the circuit; the one used on the amplifier acts as the microphone. The speaker at a distance serves in its normal capacity. Construct two cabinets from plywood so that when finished they measure about 5½ inches square by 4 inches deep. Mount a 5-inch magnetic speaker in one and the amplifier and microphone (actually the other 5-inch speaker) in the other.

The chassis is made of aluminum or any available metal bent to the shape shown in the pictorial diagram. A grill fashioned from aluminum serves as a decorative protection for the speaker and a support for the chassis. The set employs two stages of amplification supplied by a 6C5 and 6J7 metal tube. Another 6C5 is use in the rectified circuit. In wiring the set be sure that wires connect to the proper tube socket prongs since certain ones are not used. No power transformer is required since a line cord resistance drops the house current to required filament voltage.

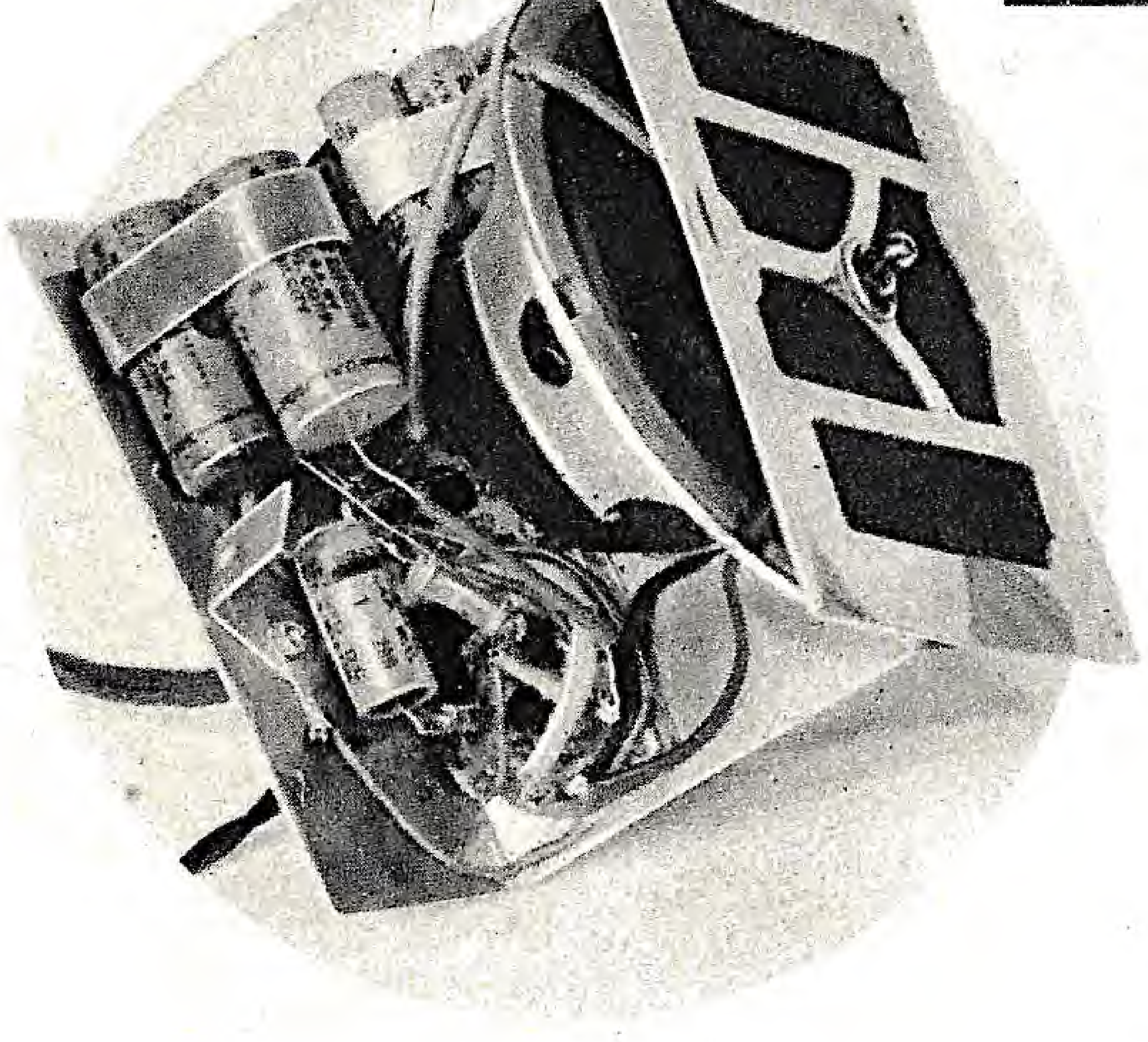
System For Home or Office



The speaker and amplifier as they appear before being inserted in the cabinets. The power switch is attached to the grill in the manner shown.

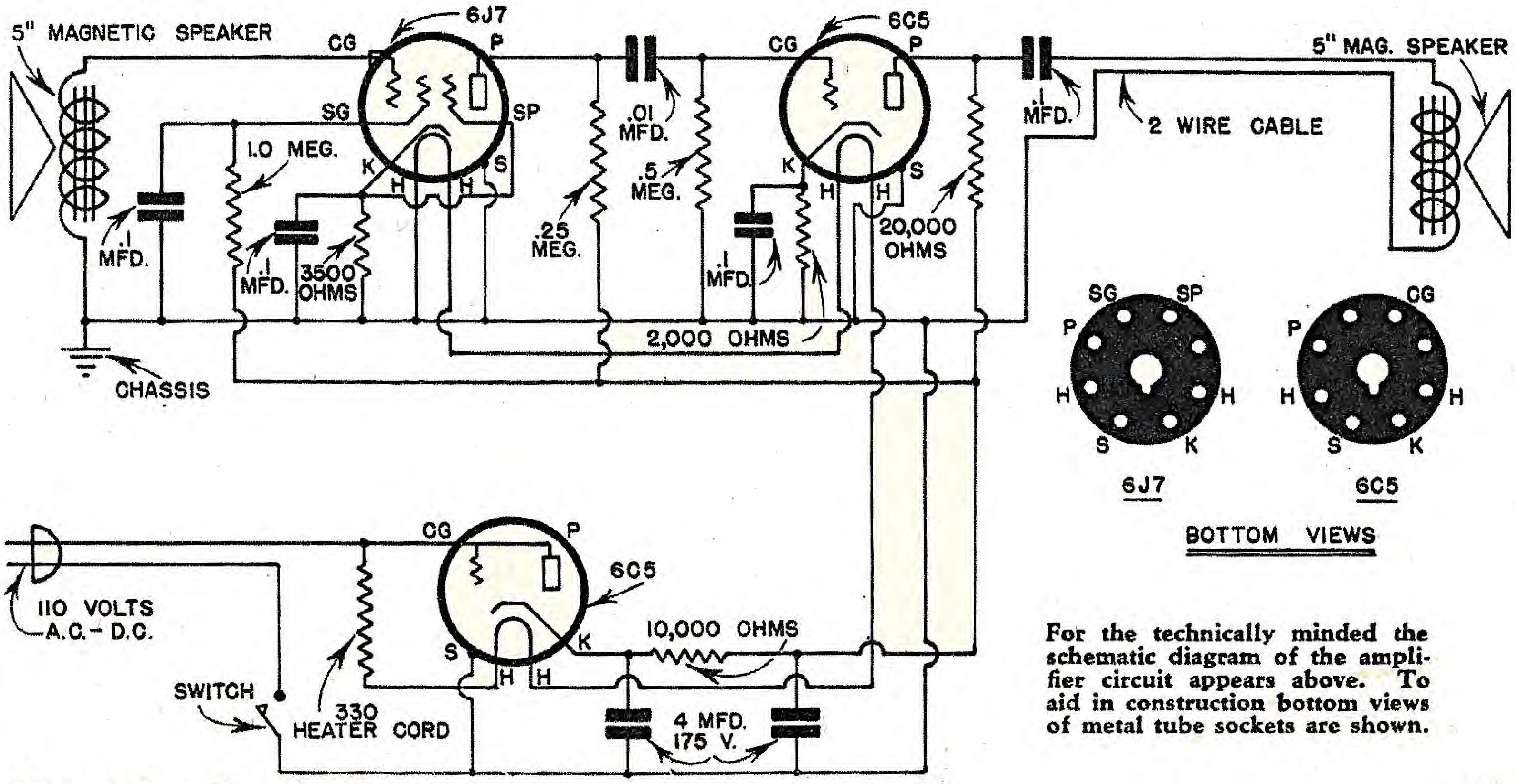


This is the amplifier as it appears when completed and in operation. Besides being useful in the office the unit makes a valuable device for conducting inter-room conversation.



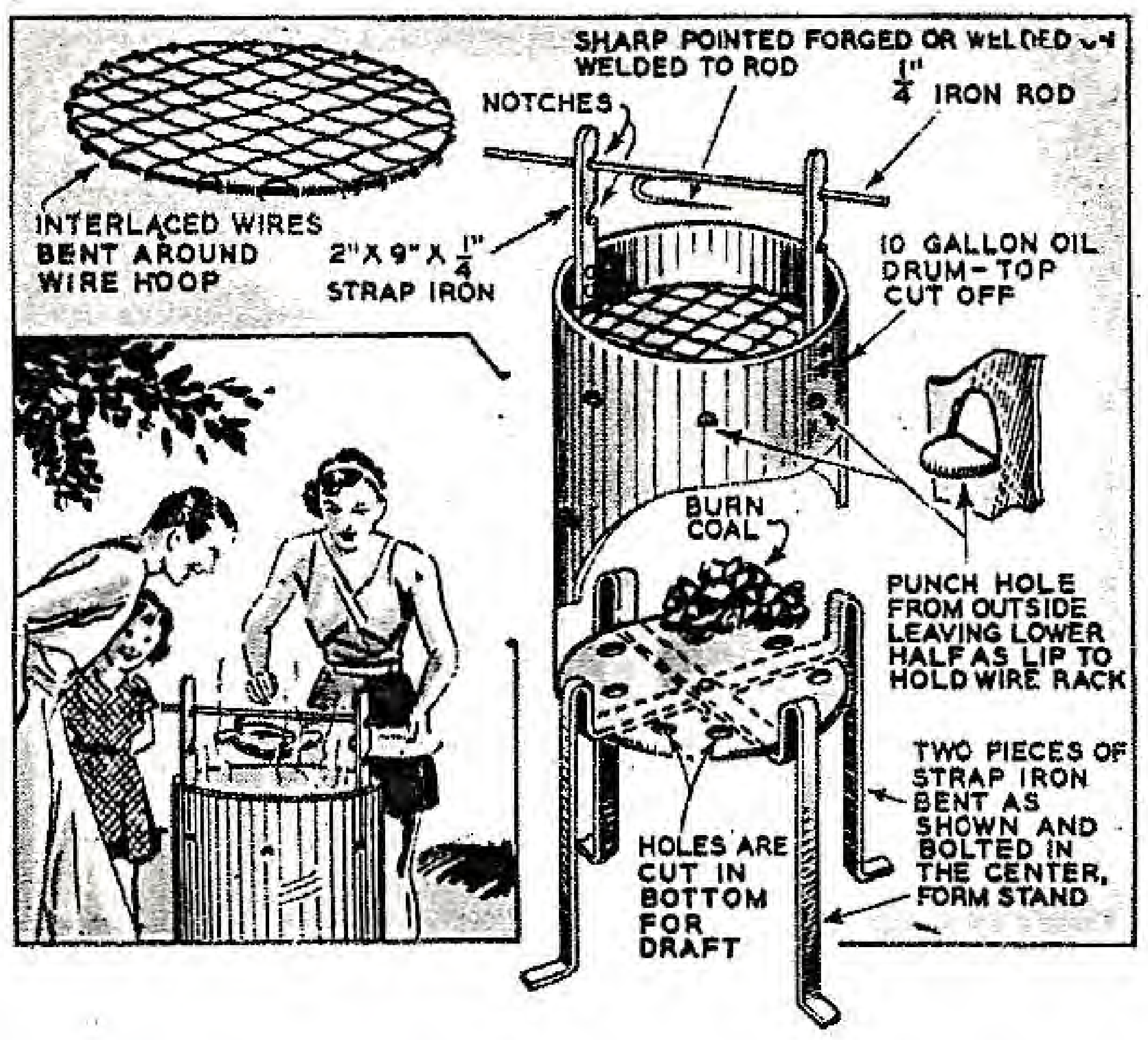
All resistors are ¼ or ½ watt carbon types since they require little space. The tubular condensers are rated at 150 volts except for the two 4 mfd. units which are 200 volt electrolytic condensers. In order to eliminate as much wiring as possible the leads have been connected directly to the chassis wherever possible.

The amplifier and loudspeaker are connected by a length of lamp fixture wire. To place the system into operation turn on the switch and after the tubes have heated speak into the speaker attached to the amplifier. The system uses very little current.


5" MAGNETIC SPEAKER
6J7
CG
P
SG
SP
K
H
H
S
1.0 MEG.
.1 MFD.
.1 MFD.
3500 OHMS
.01 MFD.
.5 MEG.
.25 MEG.
6C5
CG
P
K
H
H
S
.1 MFD.
20,000 OHMS
.1 MFD.
2 WIRE CABLE
5" MAG. SPEAKER
2,000 OHMS
CHASSIS
SG
SP
P
H
H
S
K
6J7
CG
P
H
H
S
K
6C5
BOTTOM VIEWS
CG
P
6C5
S
H
H
K
110 VOLTS A.C.-D.C.
10,000 OHMS
SWITCH
330 HEATER CORD
4 MFD. 175 V.

For the technically minded the schematic diagram of the amplifier circuit appears above. To aid in construction bottom views of metal tube sockets are shown.

TIMELY HINTS FOR OUTDOOR FOLK

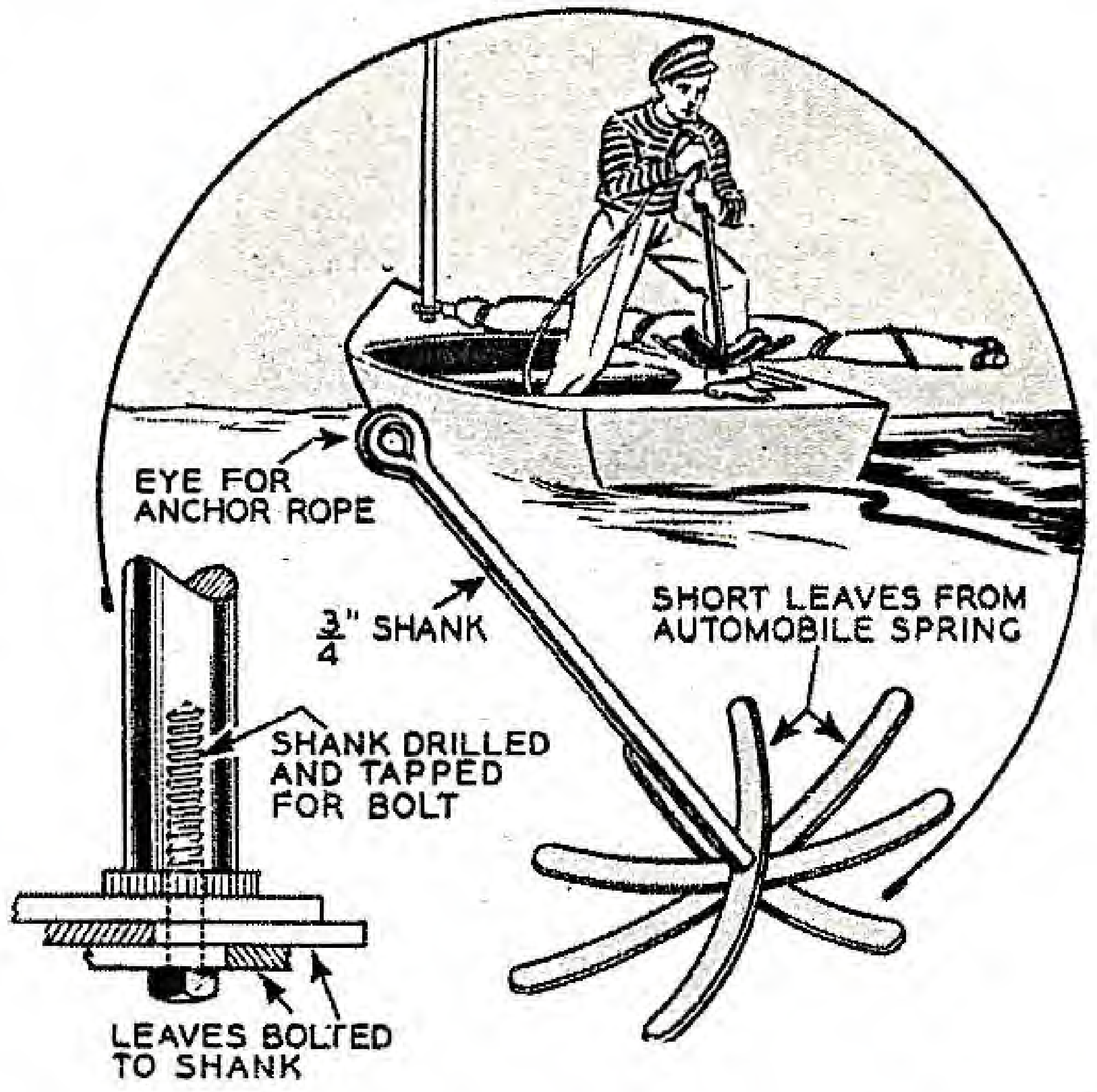

SHARP POINTED FORGED OR WELDED ON WELDED TO ROD
NOTCHES
$\frac{1}{4}$" IRON ROD
INTERLACED WIRES BENT AROUND WIRE HOOP
2"X9"X$\frac{1}{4}$" STRAP IRON
10 GALLON OIL DRUM-TOP CUT OFF
BURN COAL
PUNCH HOLE FROM OUTSIDE LEAVING LOWER HALF AS LIP TO HOLD WIRE RACK
TWO PIECES OF STRAP IRON BENT AS SHOWN AND BOLTED IN THE CENTER, FORM STAND
HOLES ARE CUT IN BOTTOM FOR DRAFT

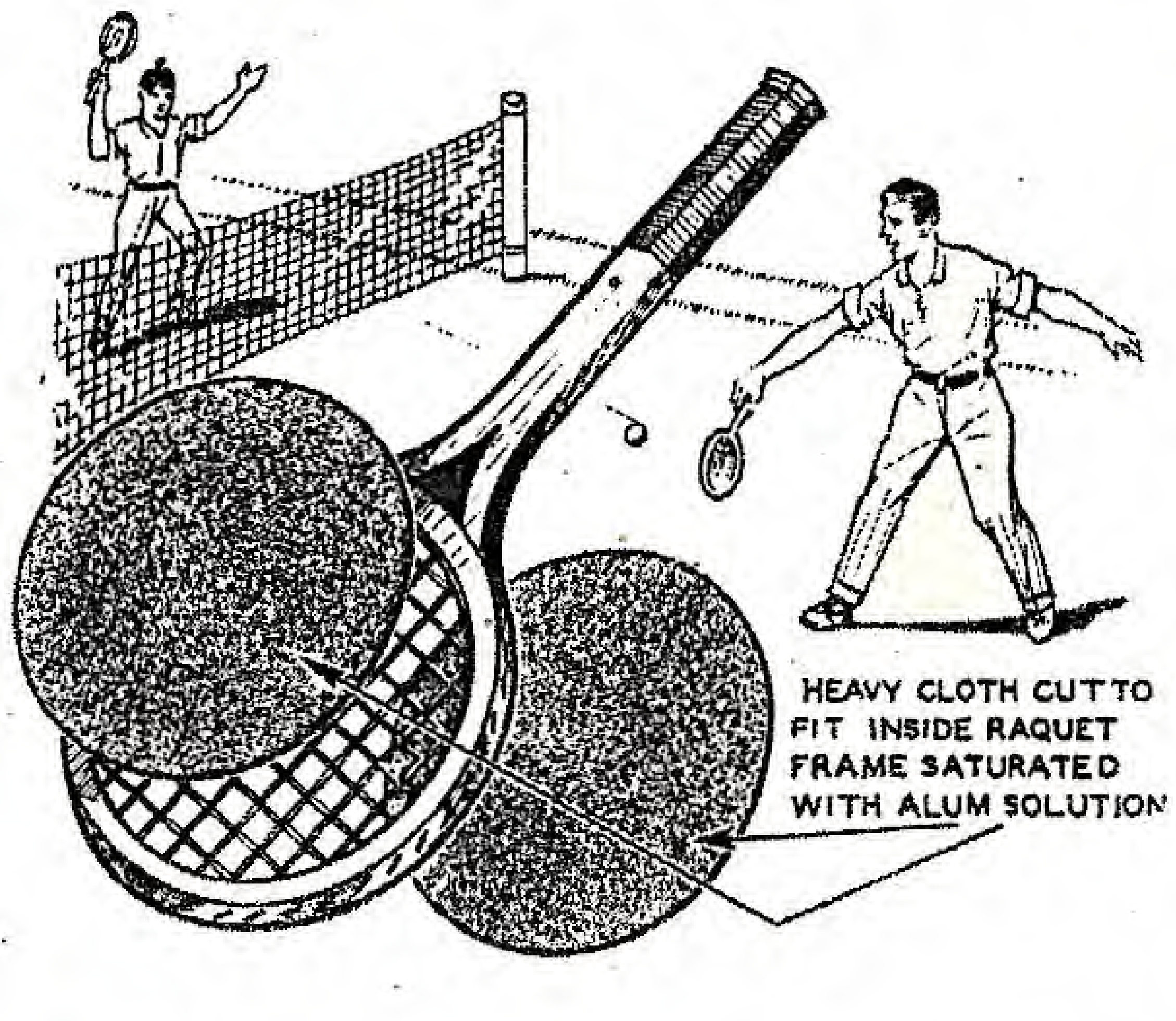
Oil Drum Makes Portable Barbecue Pit

IDEAL for outdoor cooking or roasting is this handy portable barbecue pit. The pit is constructed from a ten-gallon oil can, strap iron and a piece of wire mesh, all readily obtainable from the local scrap yard. Cut off the top of the can and then cut holes in the bottom to provide the necessary draft. Make the stand and barbecue rack from strap iron as shown. The grill rests inside the oil drop and may be used for boiling water and for preventing the barbecue from dropping in the fire. Make the grill of wire.—C. Sullivan.

Auto Spring Forms Practical Boat Anchor

A SUITABLE anchor is one of the items very often overlooked by many amateur boat fans. Not that they wouldn't use it if available, but because they didn't own one and didn't know where to secure one reasonably. Anyone the least bit handy with tools can construct a really practical boat anchor from leaves taken from an old automobile spring. Only the smaller leaves are used and these are drilled in the center so that they may be bolted to a ¾-inch shank. Spread the leaves in a fan-like fashion then tighten with a wrench. A lock washer will prevent leaves from coming loose.—Hi Sibley.


EYE FOR ANCHOR ROPE
$\frac{3}{4}$" SHANK
SHORT LEAVES FROM AUTOMOBILE SPRING
SHANK DRILLED AND TAPPED FOR BOLT
LEAVES BOLTED TO SHANK

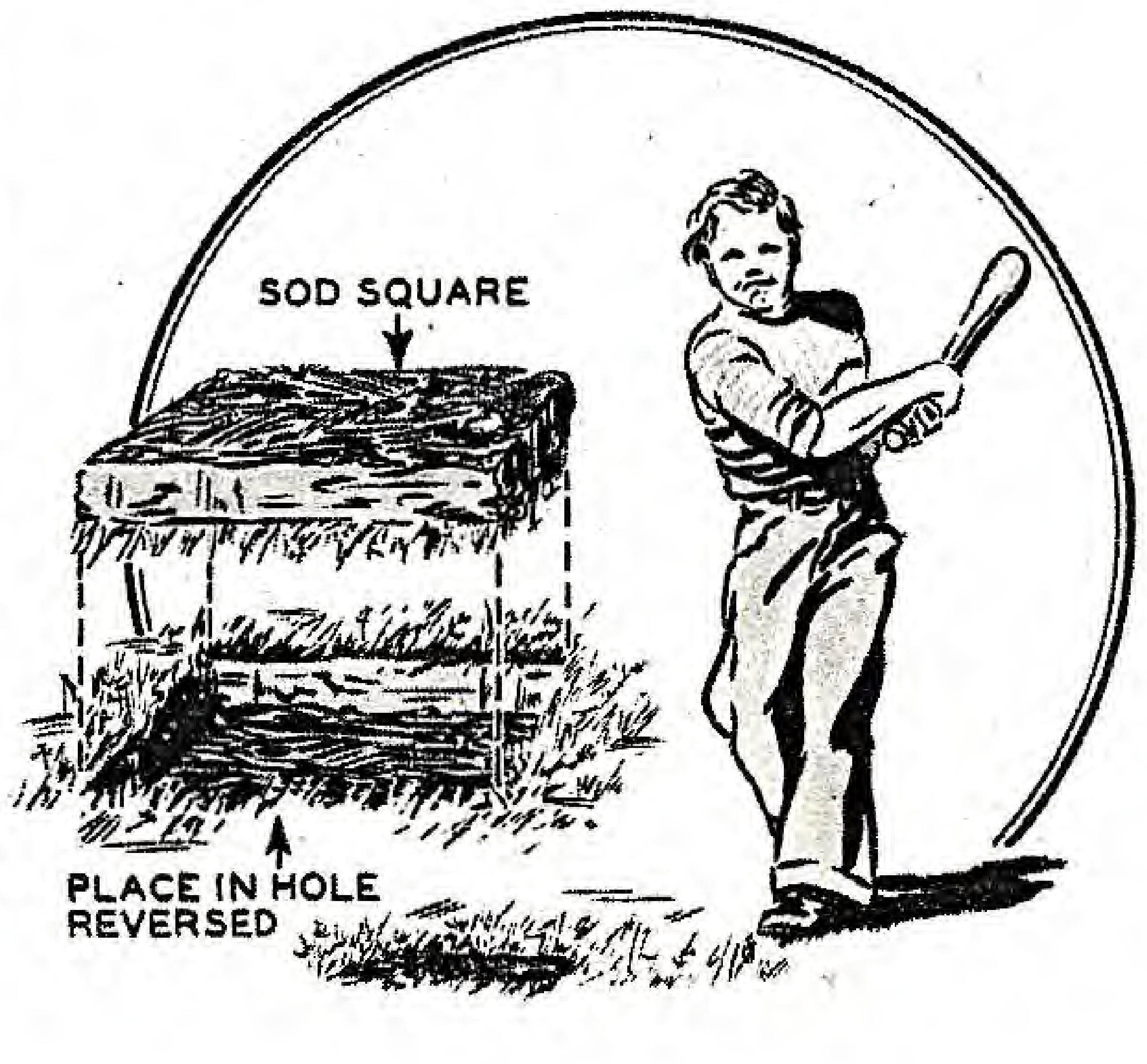

HEAVY CLOTH CUT TO FIT INSIDE RAQUET FRAME SATURATED WITH ALUM SOLUTION

Alum Pads Tighten Tennis Racket Strings

LOOSE tennis racquet strings not only prevent a fast delivery, but result in the frame twisting out of shape. It is not at all necessary to restring the racquet in order to make the strings taut again. That is provided they are not too loose. Secure a piece of heavy cloth, such as flannel and cut out two pieces just large enough to fit inside the frame. Soak these in a strong alum solution, place in the frame and then place the racquet in the press and allow the cloths to dry. When removed from press, strings will be taut.—A. Waychoff.

Inverted Sod Squares Mark Sandlot Bases

KITTEN BALL or "soft ball," as this particular form of sandlot baseball is often called, usually is indulged in by small boys who use rocks or other dangerous objects for base markers. To eliminate this danger entirely cut the bases from earth using a sharp flat spade. The roots of the grass or weeds will hold the sod square together permitting it to be removed and placed in the hole, inverted, dirt side up. This simple base marker is not only lasting, but free from all of the many dangers that lurk in the path of the child who is running around makeshift bases.—G. Hendrickson.


SOD SQUARE
PLACE IN HOLE REVERSED

SCENIC AMERICA

Many a Harley-Davidson rider has seen this beautiful spot—Lake McDonald, Glacier National Park.

from the
SADDLE of a **HARLEY-DAVIDSON**

No matter where you live, you're within Harley-Davidson distance of rare scenic spots. Hit the shorter trails over week-ends — plan care-free jaunts over distant trails for your next vacation. Harley-Davidson will take you there at least expense. . . . And for 1936 — own this year's new Harley-Davidson. Speed-lines and amazing motor improvements assure you plenty of style, power, speed and riding ease — plus remarkably low-cost mileage.

Ask your nearest Harley-Davidson dealer about his Easy-Pay Plans—get a FREE ride—send in the coupon.

Ride a
HARLEY-DAVIDSON

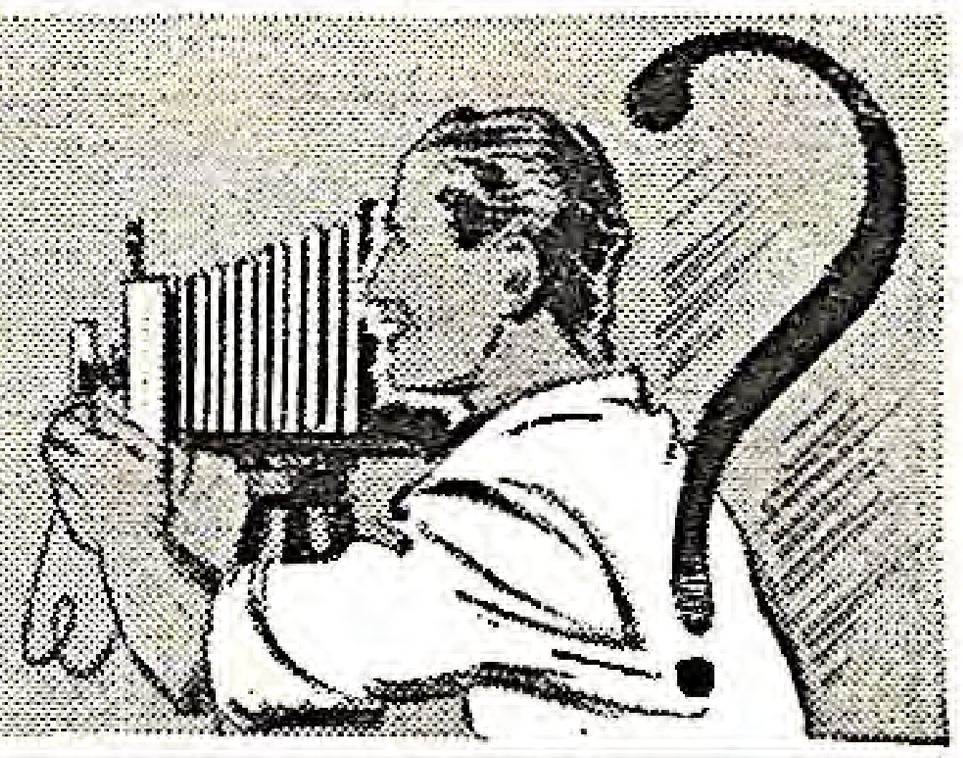
HARLEY-DAVIDSON MOTOR CO.,
Dept. MM, Milwaukee, Wis.
Interested in motorcycling. Send illustrated literature. Postage stamp is enclosed to cover mailing cost.

Name ....

Address ....

My age is 16-19 years, ☐ 20-30 years, ☐ 31 years and up, ☐ under 16 years. Check your age group.

AMATEUR PHOTO PUZZLERS
Your Camera Problems Answered



In this department the Photography Editor will answer any question or problem related to cameras of all types, enlarging, printing, developing, taking pictures, and the various phases of home movie making. When sending questions to this department, be sure to include a stamped, addressed envelope in case space does not permit publication of the question and reply on this page. Send all inquiries to the Photography Editor, Modern Mechanix & Inventions Magazine, *Greenwich, Connecticut.*

CAMERA FILM FAILS TO DEVELOP

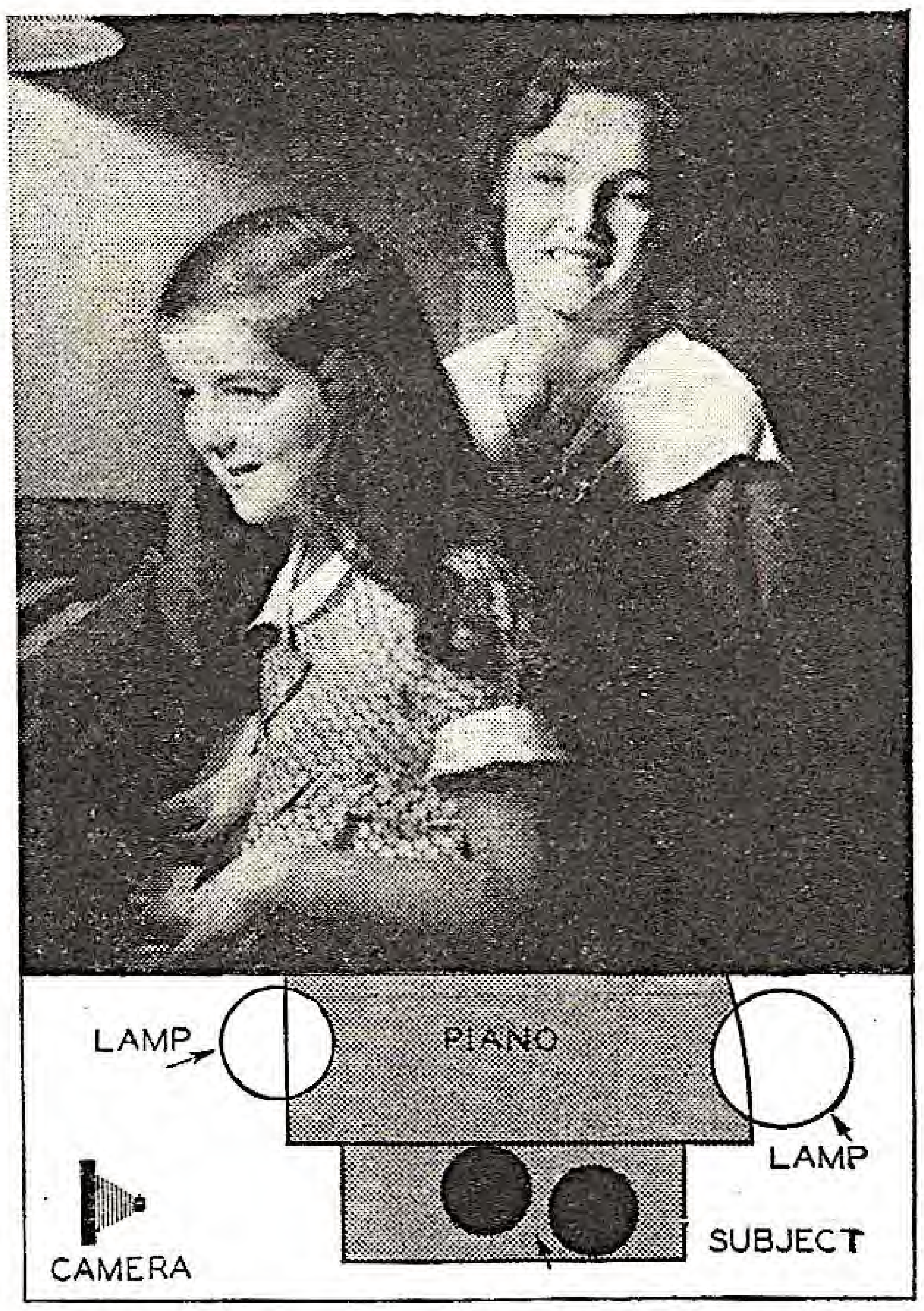
After having placed an exposed film in the developing solution for the required length of time it was removed undeveloped. I replaced the film in the solution again, this time for two of the usual periods only to find that the film was still yellow. What might have been my trouble?—C. F. H.

If your film failed to develop even after being in the solution for twice the required time it was undoubtedly due to either a badly oxidized or nearly exhausted developer. The use of a pyro developer might have also been responsible for the trouble. It is very important in amateur photo work that the hypo solutions are made from fresh salts. It is equally important that a new hypo solution be used after each day's work if satisfactory results are expected.

PICTURES BLUR AROUND EDGES

My snapshots, after being developed, usually show blurs around the edges of the prints. Is the trouble caused by my camera or is it due to some error made in developing the film?—O. Y.

Examine the edges of your negatives and see if any blurs appear on them. If not, the trouble is caused in printing. Possibly you are using a mask that is too thin, causing light to come under it so as to fog the film. If blurs appear on the film, the camera is at fault. Examine the lens carefully, it may be loose or in some way out of adjustment. Then, too, the trouble may be that you are focusing the camera on objects too close to the camera. In most cases objects should be photographed at distances of six feet or more from the camera.



Candid home scenes, like this one are not at all difficult to take. Place a few photoflood bulbs in nearby lamps, open the camera lens to F.6.3 or faster, "snap" and the picture is taken. Use super sensitive panchromatic film.

MEANING OF "FILTER FACTOR"

In reading through a camera book I came upon the phrase "filter factor" several times. Just what does "filter factor" mean?—F. L. F.

The purpose of a filter is to absorb or hold back certain wave lengths of colors of light and to transmit other wave lengths. The colors transmitted will photograph lighter and those absorbed will photograph darker. As part of the actinic light is prevented from reaching the film, the length of the exposure must necessarily be increased. The "filter factor" is the number of times the exposure must be increased over the usual exposure when using the filter. It varies with the filter and the type of film.

TIME METHOD BEST FOR DEVELOPMENT

Is it better to develop films by inspection or by the time and temperature method? Will you explain the reason for the particular method?—R. L. M.

Modern films are so sensitive that they are easily fogged if held close enough to a safelight lamp to really determine when development is complete. The better plan is to develop films entirely by the time and temperature method without any light whatsoever.

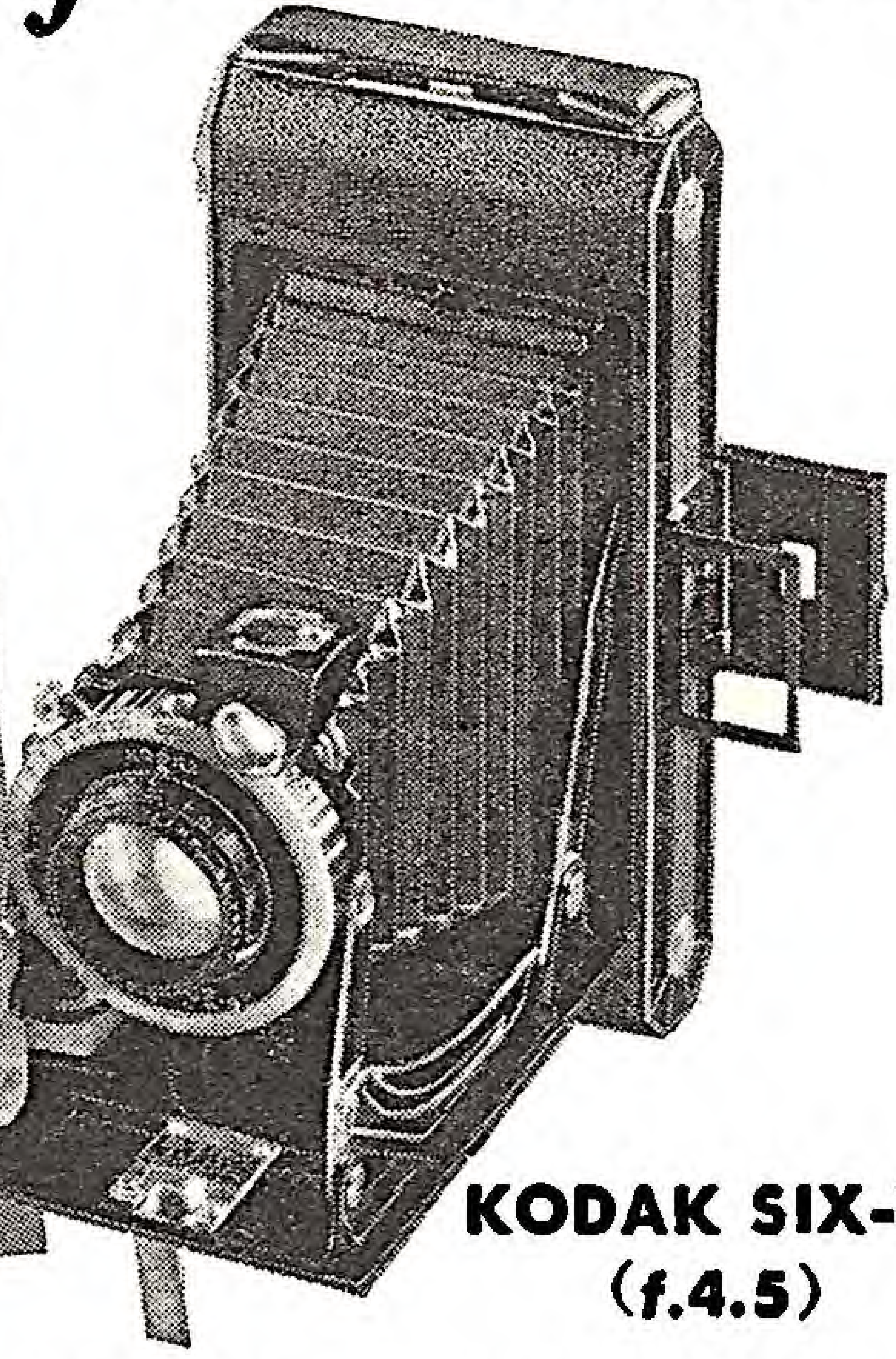
WIN $5 FOR PHOTOS

The Photography Editor will pay $5.00 for the best amateur photos received from readers. What you choose for your subject is not important so long as the picture is interesting. The picture can be an indoor scene, taken in the manner described at left, or an outdoor snapshot. Send all entries to Modern Mechanix Publ. Co., Greenwich, Conn.

No wonder it's
America's favorite fine camera—

It has all these features

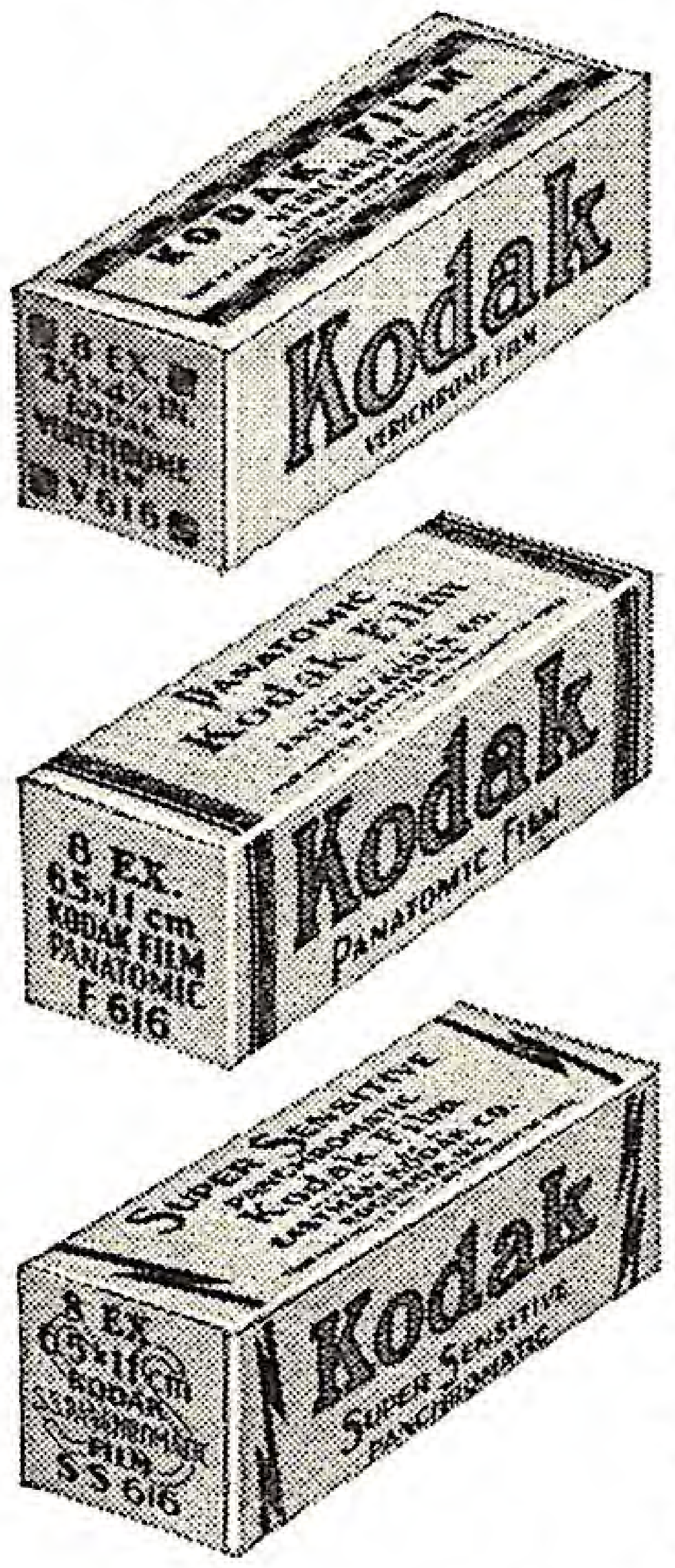
fast f.4.5 lens . . . 8-speed Compur shutter up to 1/250 second . . . delayed-action timer . . . close-up focusing . . . eye-level finder . . . action front . . . roll-film convenience . . . large picture size.



KODAK SIX-16
(f.4.5)

KODAK SIX-16 with the fast *f.*4.5 Kodak Anastigmat lens is America's most popular fine camera, by a wide margin. And a glance at its many features shows why it's a natural "first choice."

This up-to-date Kodak springs into action at the touch of a button. Both eye-level and waist-level finders. *F.*4.5 lens makes bright snapshots even in difficult light, and high-speed shutter "stops" action. It's a real all-arounder for one-camera fans. Makes 2½x4¼-inch pictures. Costs but $40. See it at your Kodak dealer's.



3 films for the Kodak Six-16

VERICHROME

FOR OUTDOORS—Double-coated Kodak Verichrome gives you bright, clear snapshots in sun or shade. It adds to the scope of the *f.*4.5 lens, and safeguards your picture results.

PANATOMIC

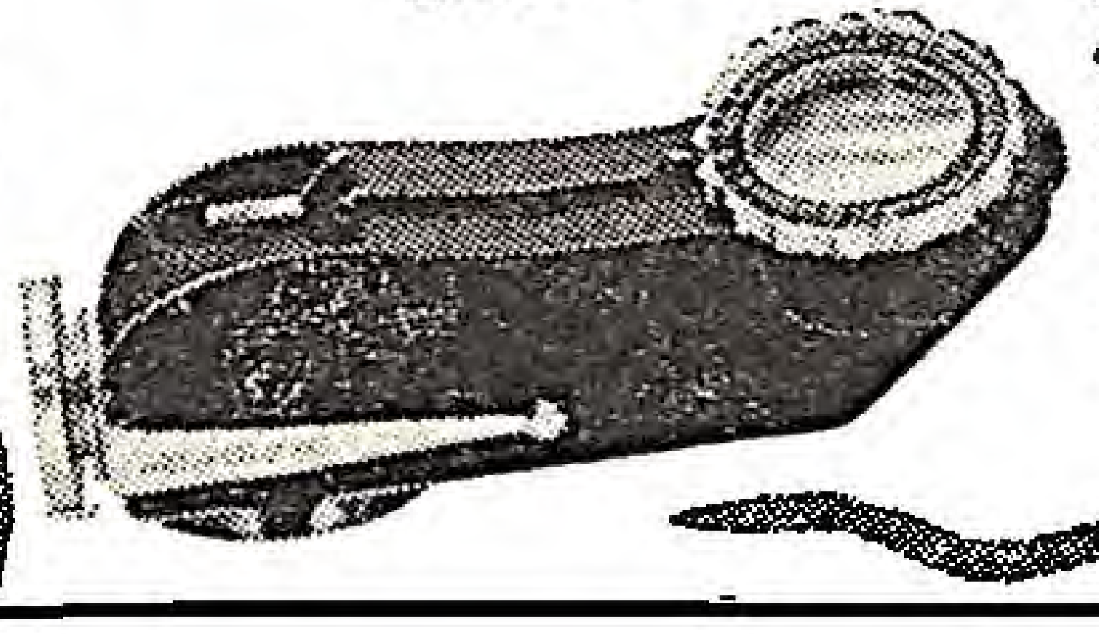
FOR ENLARGING—Kodak Panatomic, the film with the microscopic grain. Leads to enlargements of contact-print quality. Fully panchromatic, too, and amply fast for all average pictures.

SUPER SENSITIVE

FOR INDOORS—Kodak "SS" Panchromatic lets you make snapshots at night, using two or more Photoflood bulbs, and increases the range of outdoor picture-making as well.

NEW KODAK POCKET RANGE FINDER

A useful accessory with any focusing camera . . . movie or still. Measures the distance from camera to subject. Eliminates guesswork in focusing. Clips in your pocket like a fountain pen. $7.



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HOBBY FACTS

IT HAS been often said that every great man has a hobby to which he turns after the day's business. Some of these hobbies might seem strange to us at first, but after looking into them they are exceedingly interesting. For example, one man's hobby is collecting newspaper titles. In an attractive album he has pasted the part of the front page containing the name of the newspaper starting with the papers in his home town. His collection includes the papers from every major city in the world.

Another collector centers his attention on street cars and bus transfers. Still another's hobby is milk bottle caps. Strangest of all hobbies is the collection of wishbones from fowl consumed by great men. The man making the odd collection writes to various personalities during the holiday seasons asking for the bones and in many instances receives them! Stamp and coin collecting, too, is followed by many and probably the most interesting. Anyone can start a hobby. Presidents and Kings have their hobbies, why not you?

ADLETS FOR HOBBYISTS

(See regular classified section for rates and other information.)

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FREE U. S. $10.00 Stamp, Number 4316. Old Stamps are always best. All old stamps particularly those of the 19th Century, are getting scarcer every year. We offer 15 different selected 19th Century stamps, including a U. S. stamp over 50 years old, together with the current highest values U. S. stamps, denominations $2.00, $5.00 and $10.00 catalogue numbers 4312, 4315 and 4316. All for only 10c to serious approval applicants. Globus Stamp Company, Dept. 150, 268 4th Ave.. New York, N. Y.

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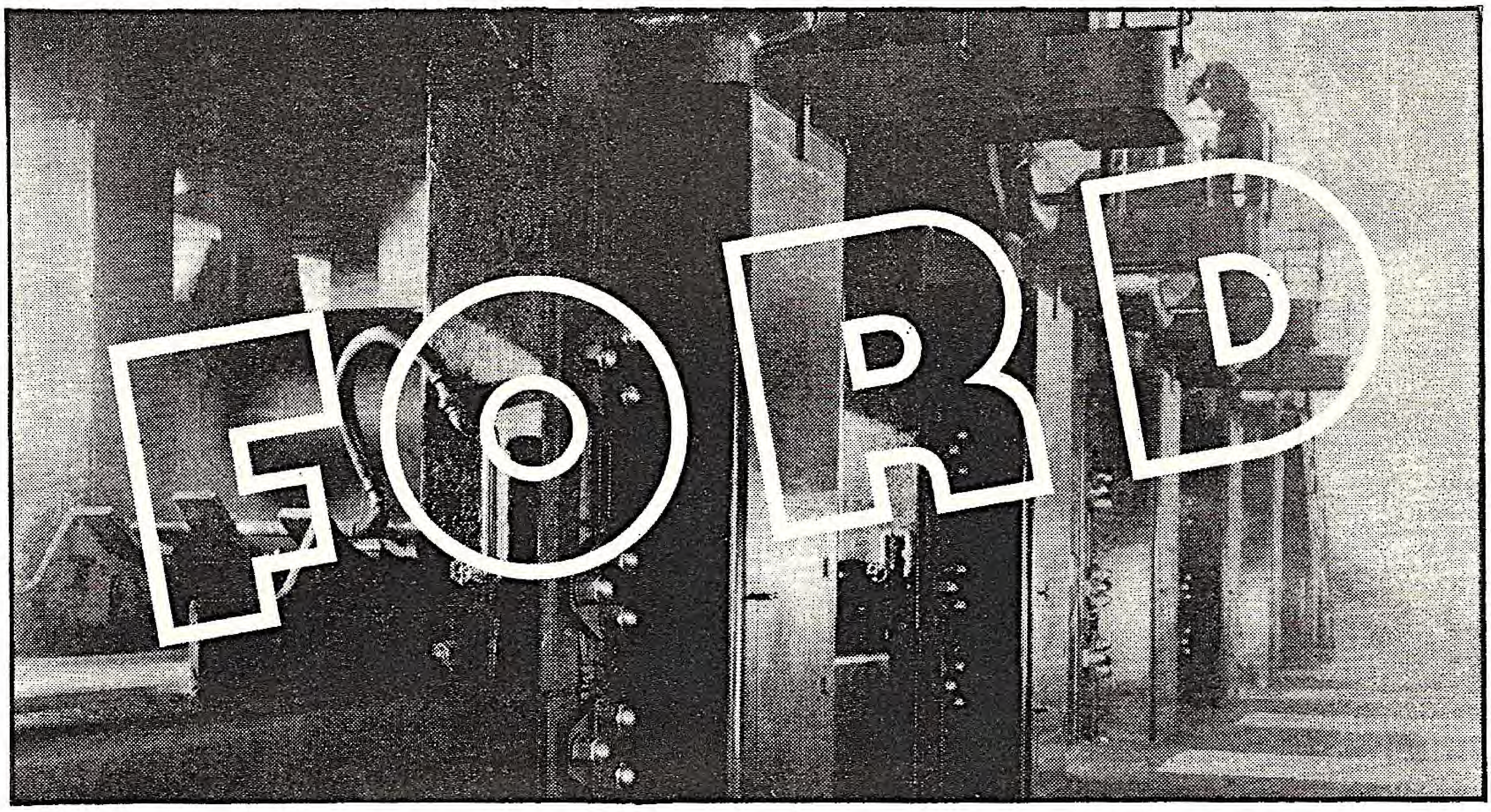
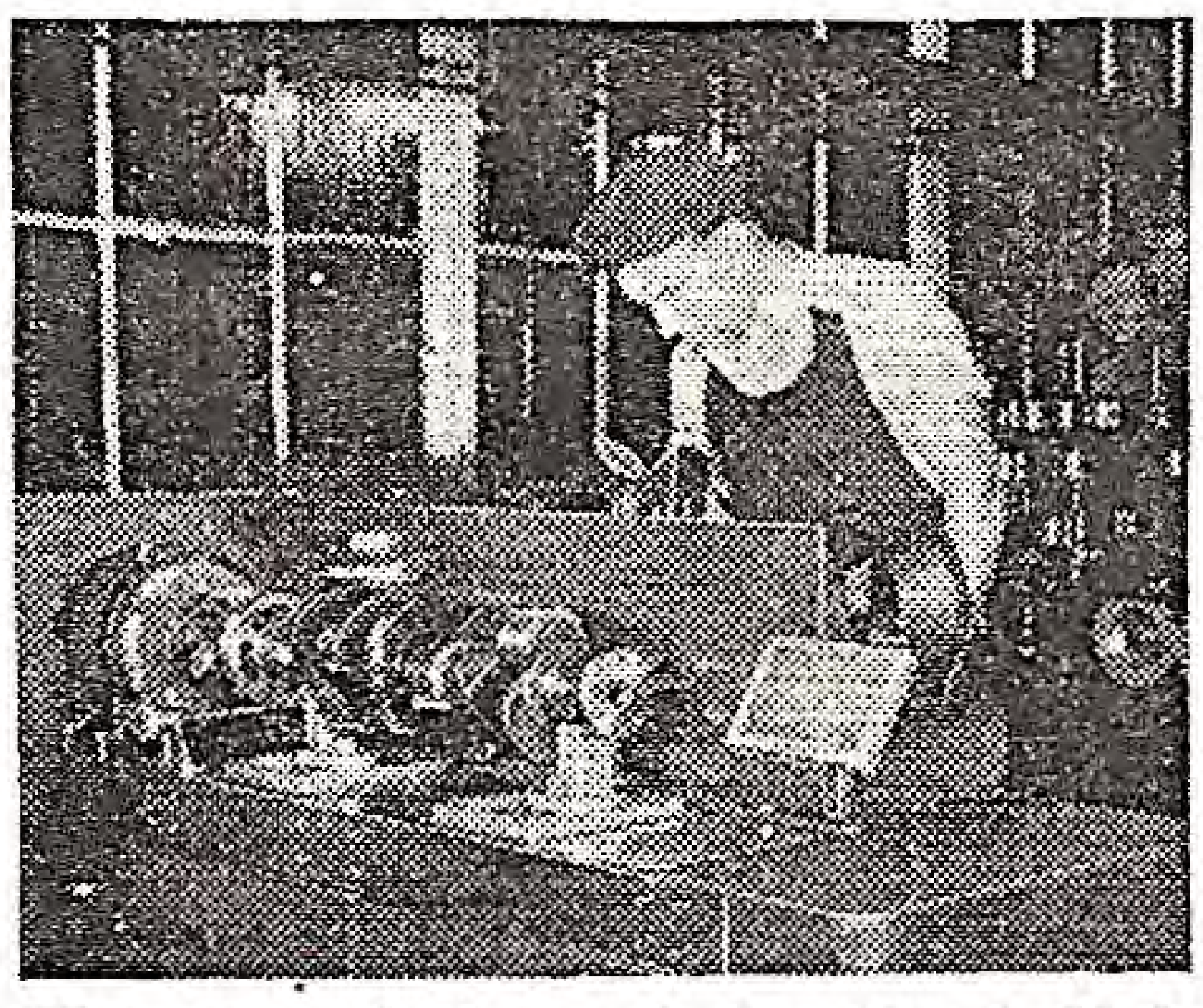
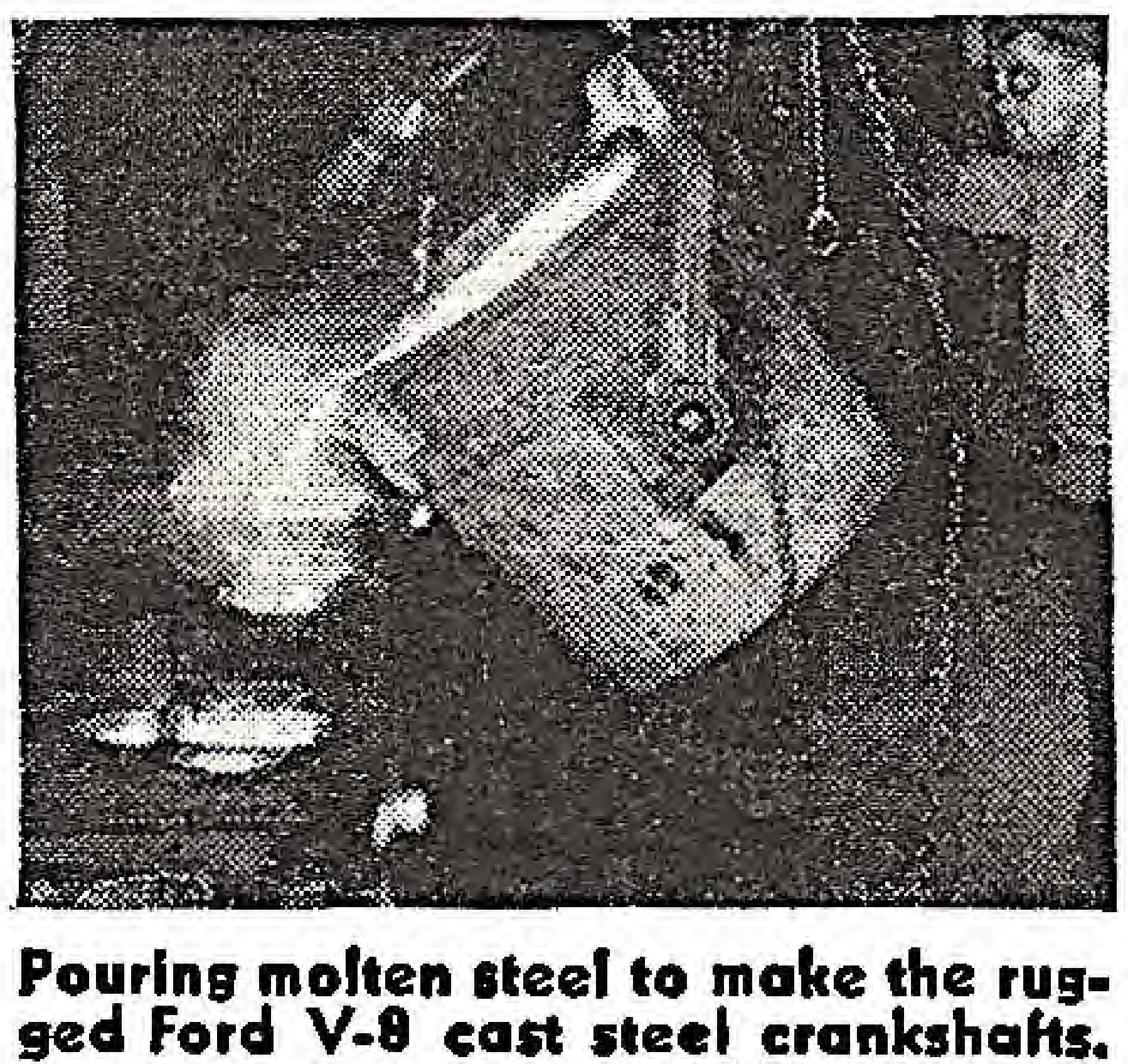
A VIEW OF THE NEW HOT STRIP MILL IN THE FORD RIVER ROUGE STEEL PLANT AT DEARBORN, MICHIGAN



has rebuilt the old art of making steel around the newer art of making automobiles



The completion of the Ford V-8 crankshaft is one of the longest tasks undertaken in building the V-8 engine. Every completed crankshaft is tested in this "dynamic balance tester."



Pouring molten steel to make the rugged Ford V-8 cast steel crankshafts. Four castings are moulded in each flask. The casting methods and the material are Ford developments.

● AMONG automobile manufacturers, only the Ford Motor Company can produce its own steels. Its complete steel plant can supply all of the many steels required for Ford cars and trucks up to 3000 units of the daily total production.

This does more than provide Ford with large quantities of fine steels at cost. It guarantees absolute control of quality at every point, by men who know both steel and automobiles.

A total of 52 different steels are used in the manufacture of a Ford V-8. Of these, 36 go into the car itself and 16 form tools or equipment used in making the car.

Few industrial organizations in the world hold steel to such fine limits and rigorous specifications as the Rouge plant. Ford metallurgists maintain close supervision over every type of steel produced, subjecting it to constant tests for chemical content, strength, and workability. They work unceasingly to improve the parts that go into Ford cars and trucks.

Such methods save time, reduce costs. These exclusive manufacturing advantages are important reasons for the high quality of Ford cars and trucks. And they are equally important reasons why you should always insist upon Genuine Ford Parts whenever you are repairing or servicing your Ford.

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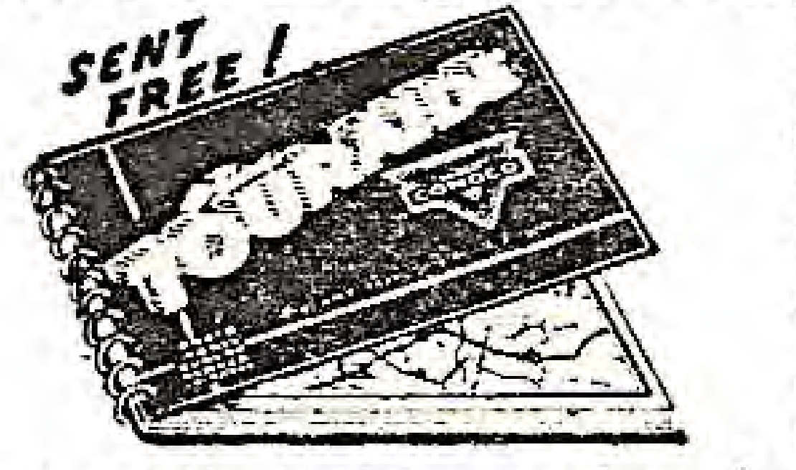

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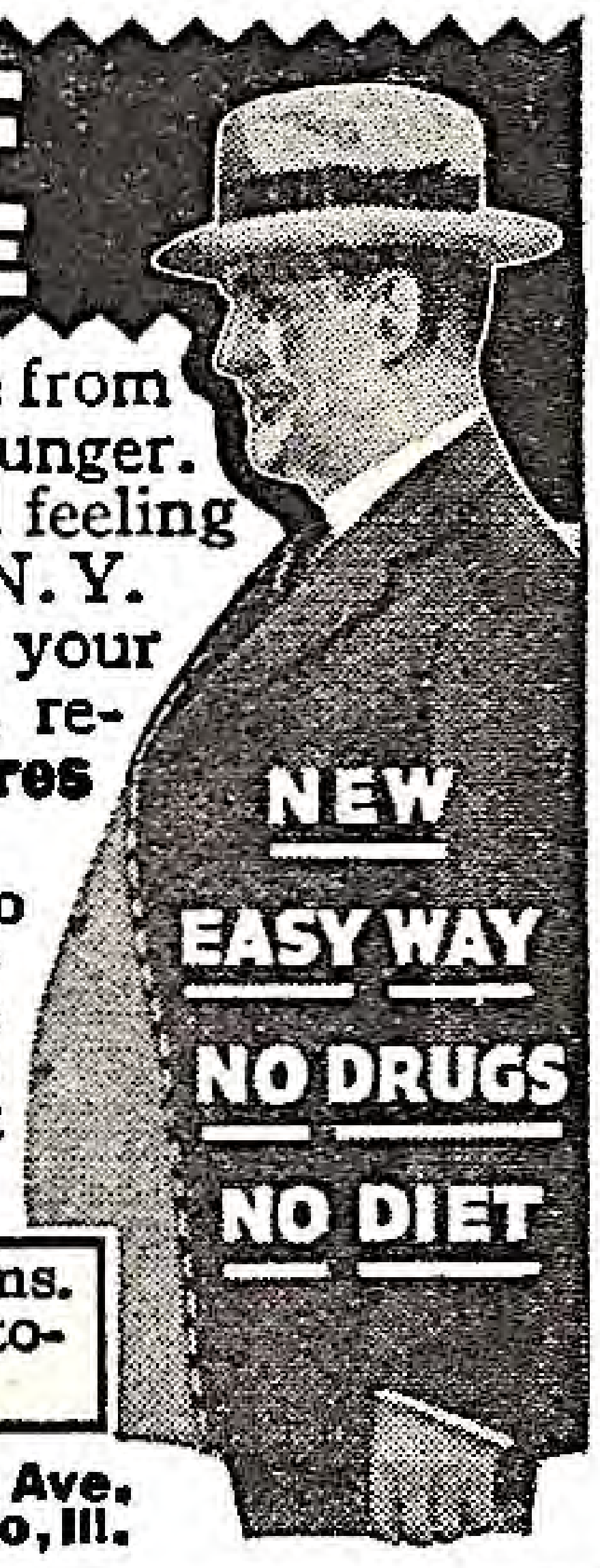

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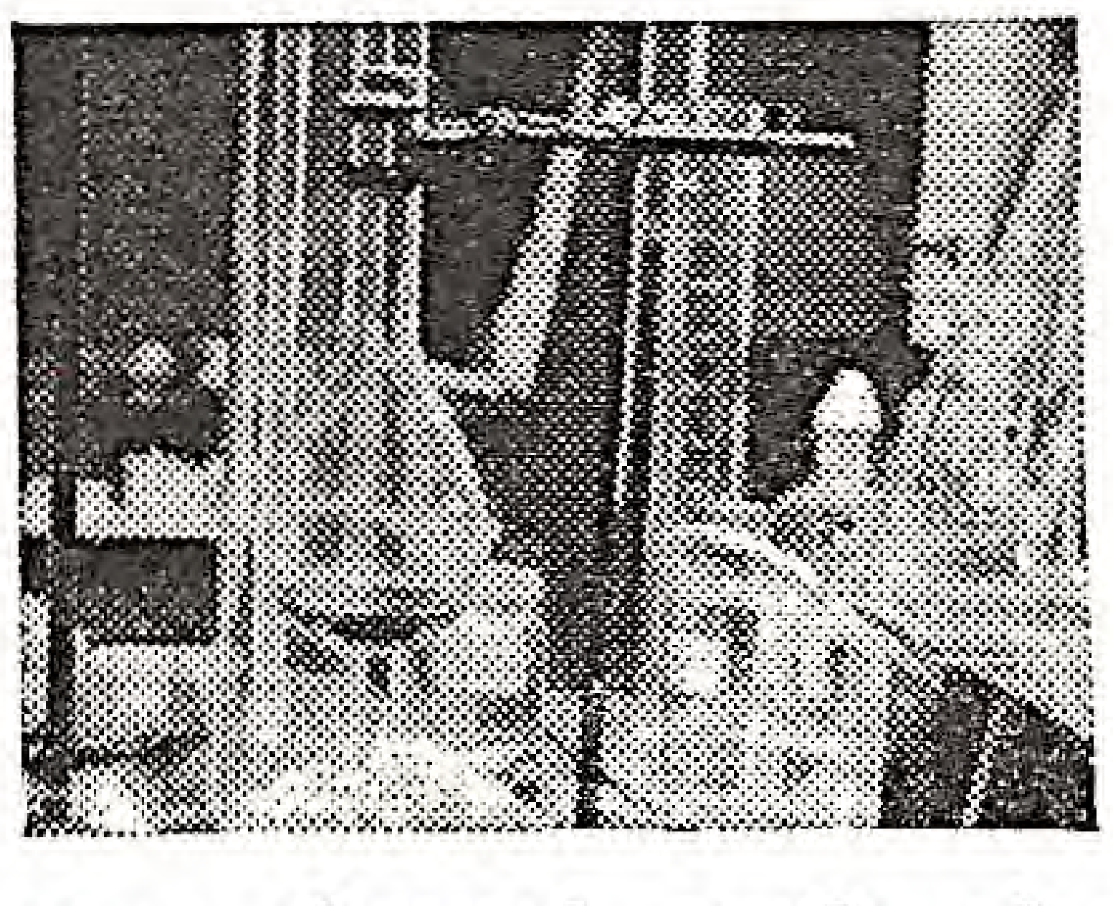

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Besting Mother Nature

[*Continued from page* 81]

reduction in fuel cost, due to the equalized distribution of heat; fewer doctor's bills; fewer cleaning and laundry bills; less repair work to be done on the furniture and structural woodwork of your house. So aside from preserving your health and comfort, you actually reduce your winter expenses.

The simpleness of installation varies with the type of system used. Progressively, installation is becoming less and less complex, so that a few years hence it will be as simple to install as a radio is today.

The operation of the machinery is exceedingly simple in most cases, the remote control for your air conditioning system is not much more complicated than the remote control for your heating system.

The average modern home is already equipped with a heating system. It is not necessary to discard the system you have to install adequate air conditioning machinery. As a matter of fact it is foolish to consider cooling and de-humidification for many homes in many localities. With this in mind the average home owner will be able to adapt an air conditioning system within his means—and as soon as this is comprehended by the general public a great service will have been rendered mankind.

Ant Palaces Create New Pastime

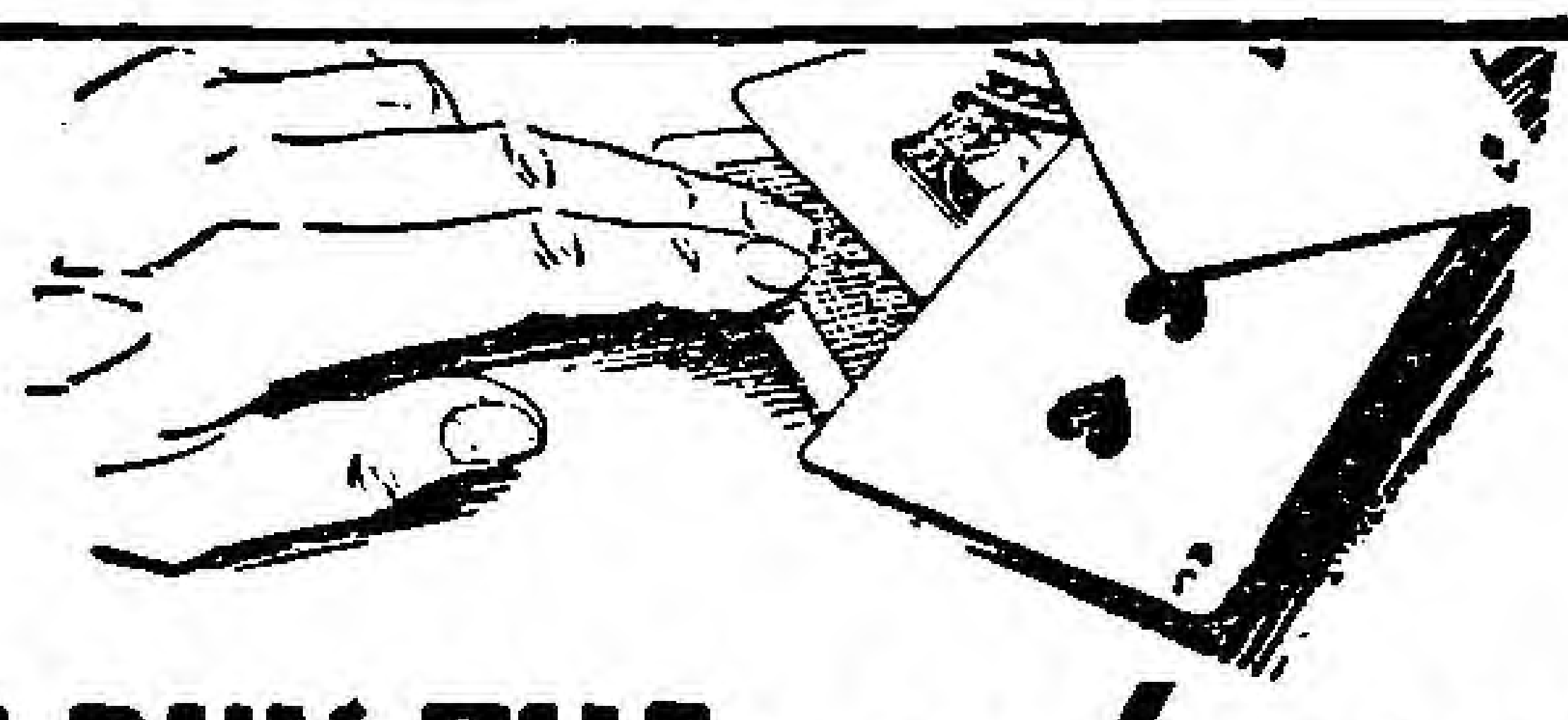
[*Continued from page* 53]

advertising man heard of Mr. Austin's strange invention, and obeying a hunch he summoned his friend, Mr. Douglass Lawder, and with their wives the two men spent an absorbing evening watching the antics of ants. Mr. Russell and Mr. Lawder commissioned their wives to make a trip to New Hampshire to see if Mr. Austin would empower them to act as his agents. They returned home commissioned as agents for the world's oddest creation.

Orders for palaces began to come in to the Russell-Lawder agency. Once started, the vogue quickly increased, and mail orders soon flocked in from all parts of the country. Mr. Austin, working at a frenzied pace in his small shop, found that he had a hard time keeping up with demand, so he hired two more men to help him make palaces, and several boys to gather ants.

Meanwhile, schools all over the country are ordering ant palaces, recognizing the dramatic and visual lesson they teach. More and more curious people are getting palaces just for the amusement they furnish. Up in New Hampshire, Mr. Austin is glad that spring has arrived. Says he, with typical Yankee humor: "Now I can gather my ants with a vacuum cleaner instead of an ice pick!"

The Cards are stacked against you



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4 BLADES
FOR 10¢

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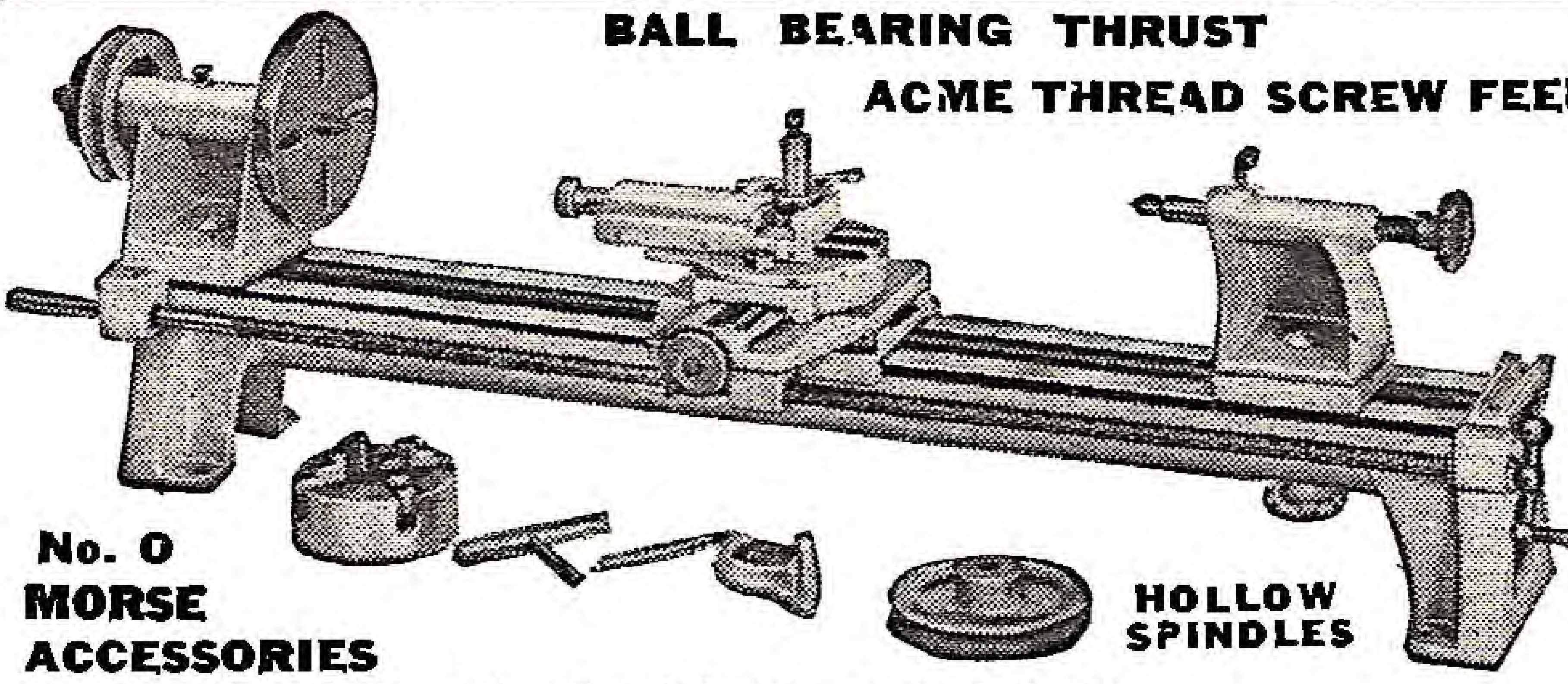

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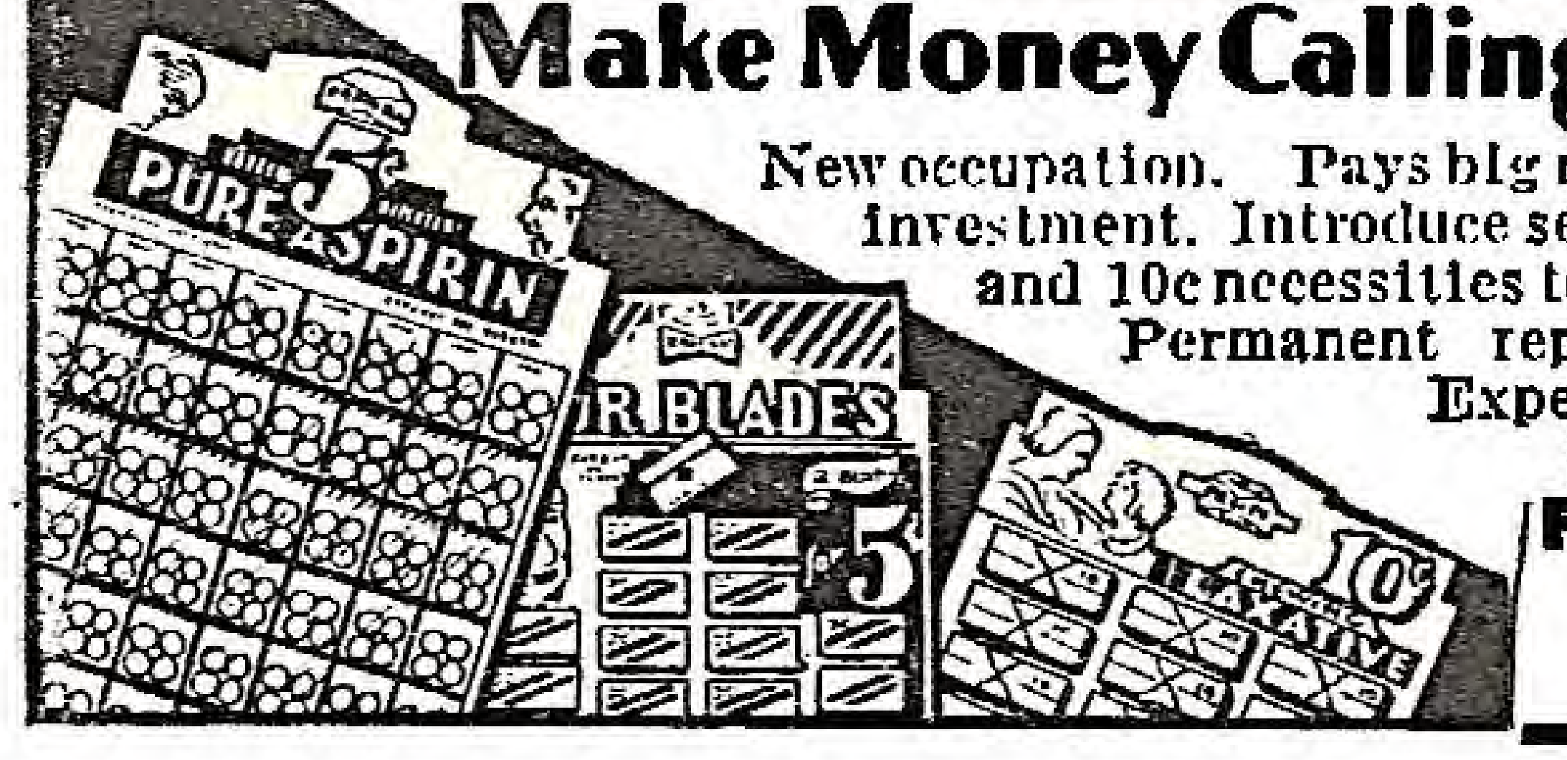

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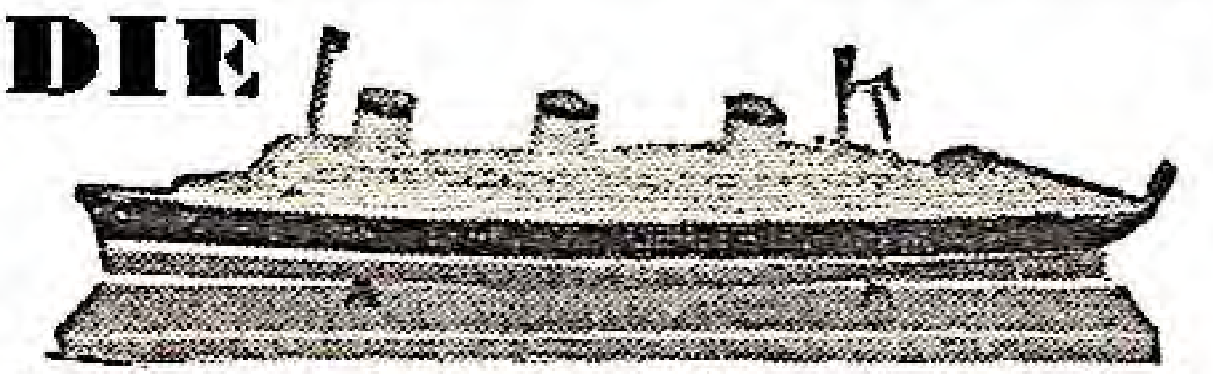

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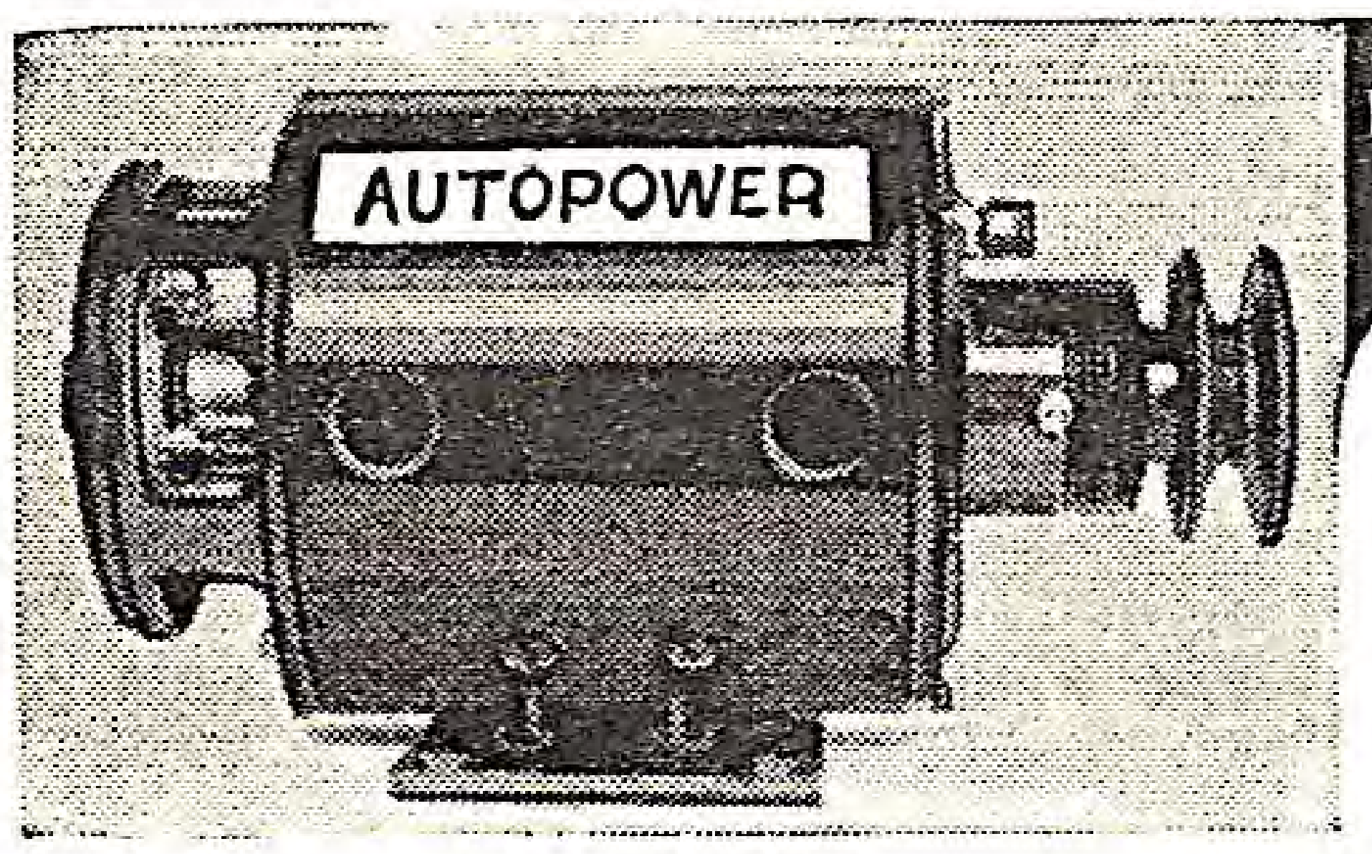

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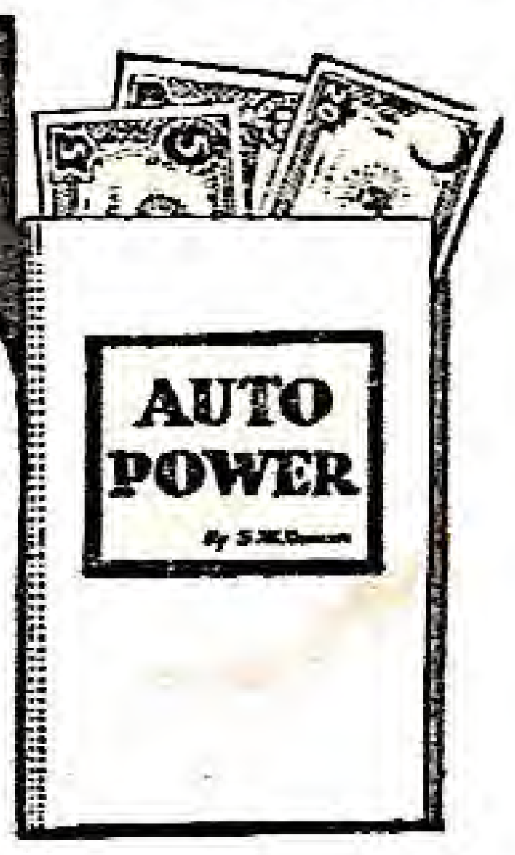

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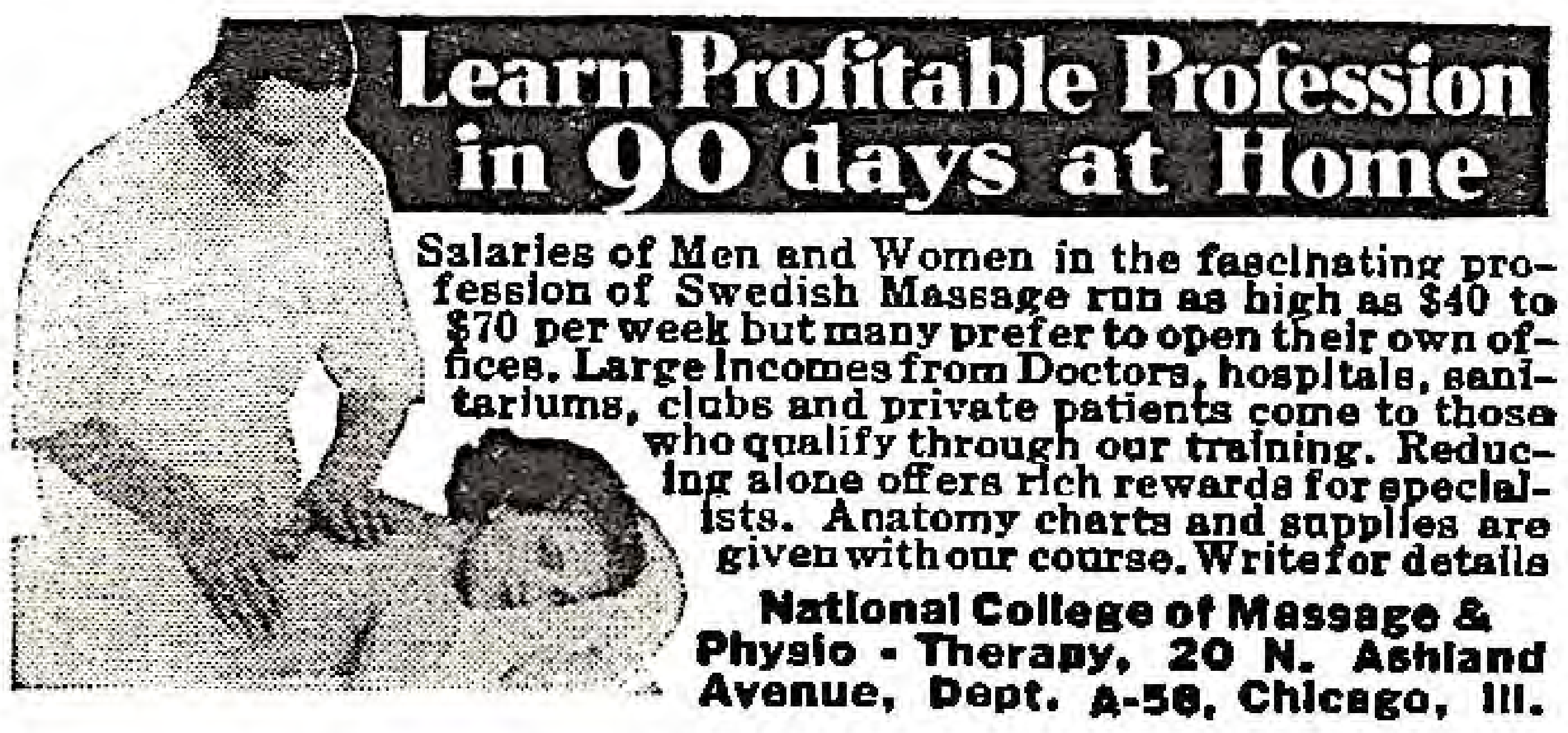

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Plans for "Buzzer"

[*Continued from page* 102]

materials than 6-inch stock as the saw necessary for such work would be so wide that the planking would be too thin.

When cutting planks, the gauge should be set to the exact center of the piece to be cut. When you are sure that the center is right, saw first from one edge; then turn the board over and saw from the other, using a thin 8-inch hollow-ground saw. Planking for the *Buzzer* was cut in this manner for the $\frac{5}{16}$-inch planking. This sawing cost $1 for the planking and brought the total planking and decking cost to $10.

Planking can be either of white or red cedar.

Chine and sheer pieces are preferably of 1x2-inch stock though lighter material may be used if desired; battens were sawed from 14-foot 1x6-inch white pine planks and then resawed into strips of $\frac{5}{16}$-inch thickness.

Divide Frames Into Four Parts

Each frame is divided into four equal parts on the side and marked. Each resulting mark is the centerline for one of three battens shown in the drawings. Set up the boat frame, then place first plank temporarily in position on the chine. Mark the chine curve and the curve of the batten. Remove the plank and cut to shape. All other planks are marked likewise and shaped with saw and plane for fitting. Thus the boat now has frame, battens and chine plank in place. Before any side planks are laid, the battens are painted thoroughly with marine glue. Then the planks are fastened, first by screws to the frame; then by copper nails to the battens.

As shown in the diagram, the bottom is double planked with a layer of heavy, painted muslin between each layer.

Before laying, the frame and sub-bottom are heavily painted. Then, pressing hard to force the paint through the cloth, the muslin is stretched from stem to stern and up around the transom where it is fastened as the transom boards and bolted fast to the frame.

Now the boat is ready for decking and finishing. Here the builder has a chance to show his ingenuity, because there is plenty of room for leeway on the finishing touches.

The same sized planking is used for the deck as for the bottom, but it is grooved with a file to represent much narrower and more expensive lumber. This is a trick that adds class without cost.

Blueprints for this trim little runabout are well in scale with the reasonable construction costs. Accurately laid out from the drawings in this article and transferred to tough paper for workshop use. They can be obtained by sending $1.50 to Modern Mechanix Publishing Co., Fawcett Bldg., Greenwich, Conn.

Television—Next Industrial Boom

[*Continued from page* 37]

which such an expert as Mr. Farnsworth agrees are well within the range of probability.

Astronomers could view a heavenly body through binoculars a thousand miles wide. Two telescopes several hundred miles apart could be trained on the same star, the images scanned by television and transmitted to common eyepieces which would give a three-dimensional effect.

The Lusitania or long-lost treasure vessels of the Spanish Main could be discovered and viewed on the ocean floor by dropping a suitably illuminated television transmitter from a salvage ship.

"But what will television do to our everyday lives?" I asked. "A great many prophets believe it will put the movie theatres out of business by giving us sound pictures in our own homes."

Theaters to Be Helped by Television

"On the contrary, it will help the theatres," Mr. Farnsworth replied. "Radio was expected by many to put the phonograph makers out of business, but more phonographs are sold today than ever before. Hollywood will be kept jumping supplying pictures for leasing to television broadcasting stations—a vast new market for its output.

"The theatre will not suffer because it is a fundamental instinct for human beings to get out among other people when they seek entertainment. And by running trailers on home television sets, theatre owners have a powerful new form of visual advertising to lure more customers within their doors."

Principles of Television Explained

Complex as it is in its development, the principle of electronic scanning is simple enough fundamentally. Inasmuch as it is the basis for the most striking of modern miracles, it is well worth a few minutes' study.

An actor, a baseball player, the participants in a news event, or anything else it is desired to televise, projects an optical image upon a photo-electric film or cathode. This image, by the action of scanning, is broken down into thousands of tiny components like the dots which comprise a halftone newspaper cut. Each element or point of the image on the cathode emits electrons in numbers proportional to the light intensity at that point. These electrons move rapidly toward the anode in myriads of tiny streams or rays, each ray conveying, by its intensity, the brightness of some point of the scene. These rays can be directed or bent by magnetic fields. A steady field, called the focusing field, keeps all of these rays in an orderly bundle so

[*Continued on page* 131]

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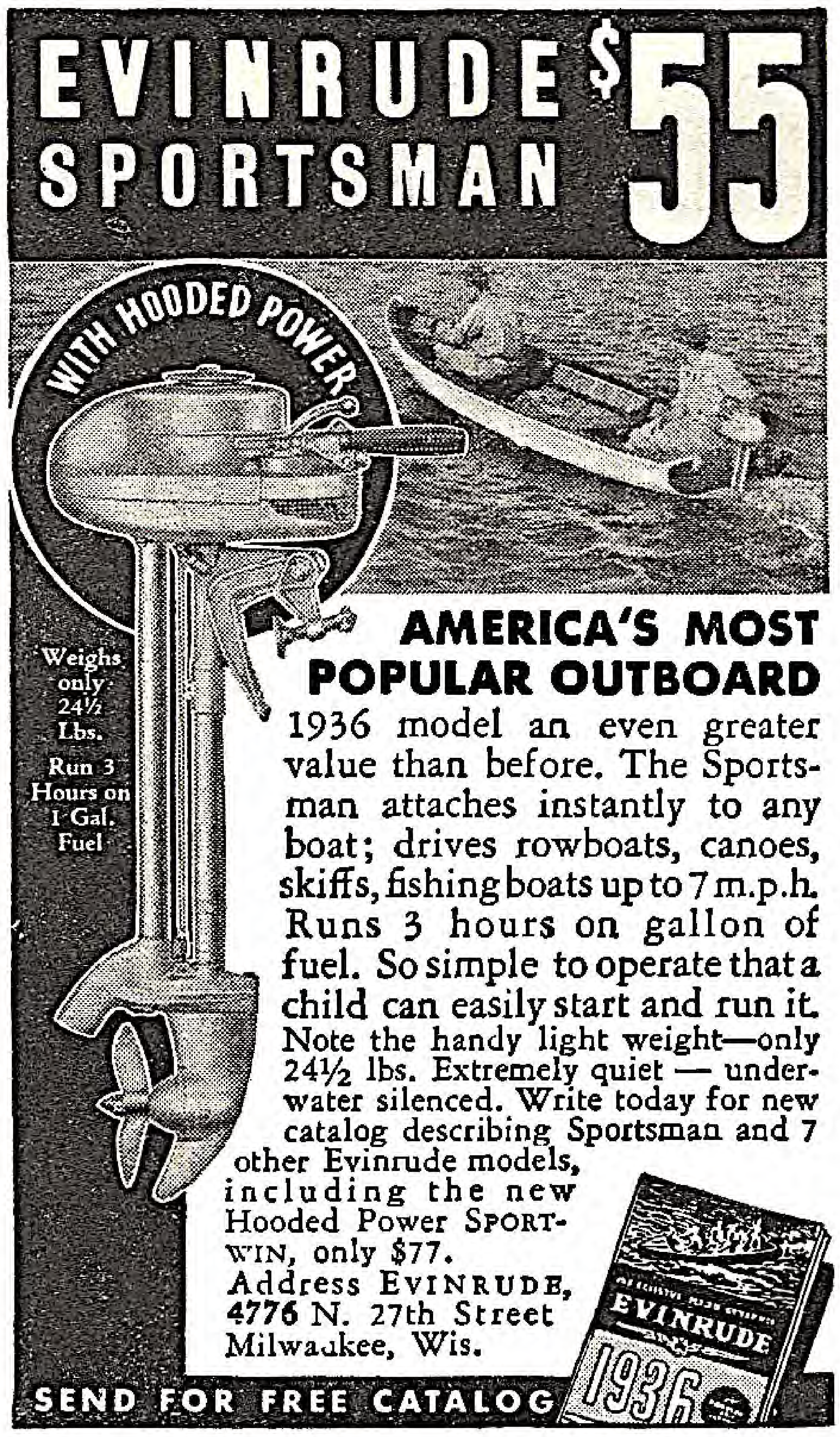
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"Cruisemite"—Ideal Trailer Home

[*Continued from page* 94]

sunk as shown in the detail plans. The clips are set in by rough saw cuts as this portion of the floor is covered later by the ceiling.

Screw 1" half round between the stanchions with its bearing face flush to the inside face of the stanchions. This will afford a hold for the inner ceiling, which may be of 1/8" or 3/16" fir plywood, or pressed wood.

Painting the framework is next. Use boiled linseed oil and turpentine, mixed half and half and kept in a double boiler to heat it. Apply a coat of the mixture to all the outside wooden members and steel work Apply several coats to the wood to preven dry rot.

Cut the holes in the ceiling for the ventilators. These are a positive necessity, and may be built yourself, or by a tinsmith out of 14-gauge galvanized iron. Now put in the windows and the screens, making them as detailed. The windows in this trailer are a joy to the man who builds his own since no fancy sash work is required. The windows hinge in, and the screens hinge out. Double strength plate glass or safety glass is used for the windows and may be secured cheaply in many instances from a used car junk yard.

Before putting on the outside ceiling, cover the roof with grade A muslin, and dope it

[*Continued on page* 133]

Build Models of Racing Planes

[*Continued from page* 108]

reversing to repeat the process. Take two of the bulkheads and slip them on the tube, one near the front, the other towards the rear, to hold the tube in alignment while the cement sets. *Do not cement these bulkheads in place at this time.*

When tube is thoroughly set, remove the two bulkheads and check all bulkhead openings so that they fit snugly and truly on the tube you have formed.

Fit the front landing struts at this time instead of leaving them until after the stringers are in place, as it is a ticklish business to insert them later. Bend the front wire strut to the dimensions given in Fig. 4 and build up the strut fairing as shown. Glue the front struts in place to the bottom of the tube and to the bulkhead, aligning them against the marks you have penciled on bulkhead No. 4 for this purpose. With these struts in place the landing gear can be dismissed for the time being or you can put in the rear struts now if you like. At any rate cut out the slots for the rear struts as marked on bulkhead No. 6.

When all the stringers are in place put in the tail post and line up the stringers which converge at this point. Study the side view

[*Continued on page* 142]

Can Science Make Us Live Forever?

[Continued from page 56]

have "come alive" and resumed their normal functions. Admittedly the prospect of being dessicated may not appeal to the human being who wants to be stored away for a few hundred years, but there may be other answers to the problem.

Lindbergh Life Chamber

When the solution to rejuvenation is finally achieved, it will probably be found that the Lindbergh life chamber, now only a few months old, played a vital part. It is a glass apparatus in which a synthetic blood is made to circulate, with a mechanical "heart" to pump it and a "lung" to purify the fluid. Whole organs can be kept alive in the chamber for an indefinite period and studied just as if they were alive in the body.

Thus an amazing new vista of possibilities is opened up to the scientist. At some distant day, a person with a weak heart may simply go to a surgeon and have a spare organ grafted in—a "booster" heart, so to speak, which will relieve the weakened one of strain.

A diseased organ, such as one attacked by cancer, might also be completely removed without danger, after a healthy substitute had been transplanted and taken up its functions.

Why is it that certain individuals live naturally to advanced ages of a hundred years and more? Because of diet, mode of life, heredity? Answer that question and you can show every human being how to become a centenarian. The vital force which enables a man to live to a hundred years is lying dormant in the bodies of every one of us, if we only knew how to use it.

The Puzzle of Heavy Water

By far the simplest method of insuring eternal youth is the elixir of life sought by the ancients—and which, amazingly enough, we may have at our disposal today. Chemists call it deuterium oxide; popularly it is known as "heavy water." It is only a few months since Dr. Harold Urey was awarded a Nobel Prize for its discovery. Heavy water differs from ordinary water in that it possesses an extra molecule of hydrogen.

The startling part heavy water may play in medicine is expresed by Dr. Stephen J. Toner of St. Mary's College:

"All available evidence points to the fact that heavy water slows down the normal chemical life processes. I am inclined to believe that as our frontiers of knowledge in this respect are pushed back we will find that the accumulation of heavy water in the tissues may tend to prolong youth rather than to induce premature old age."

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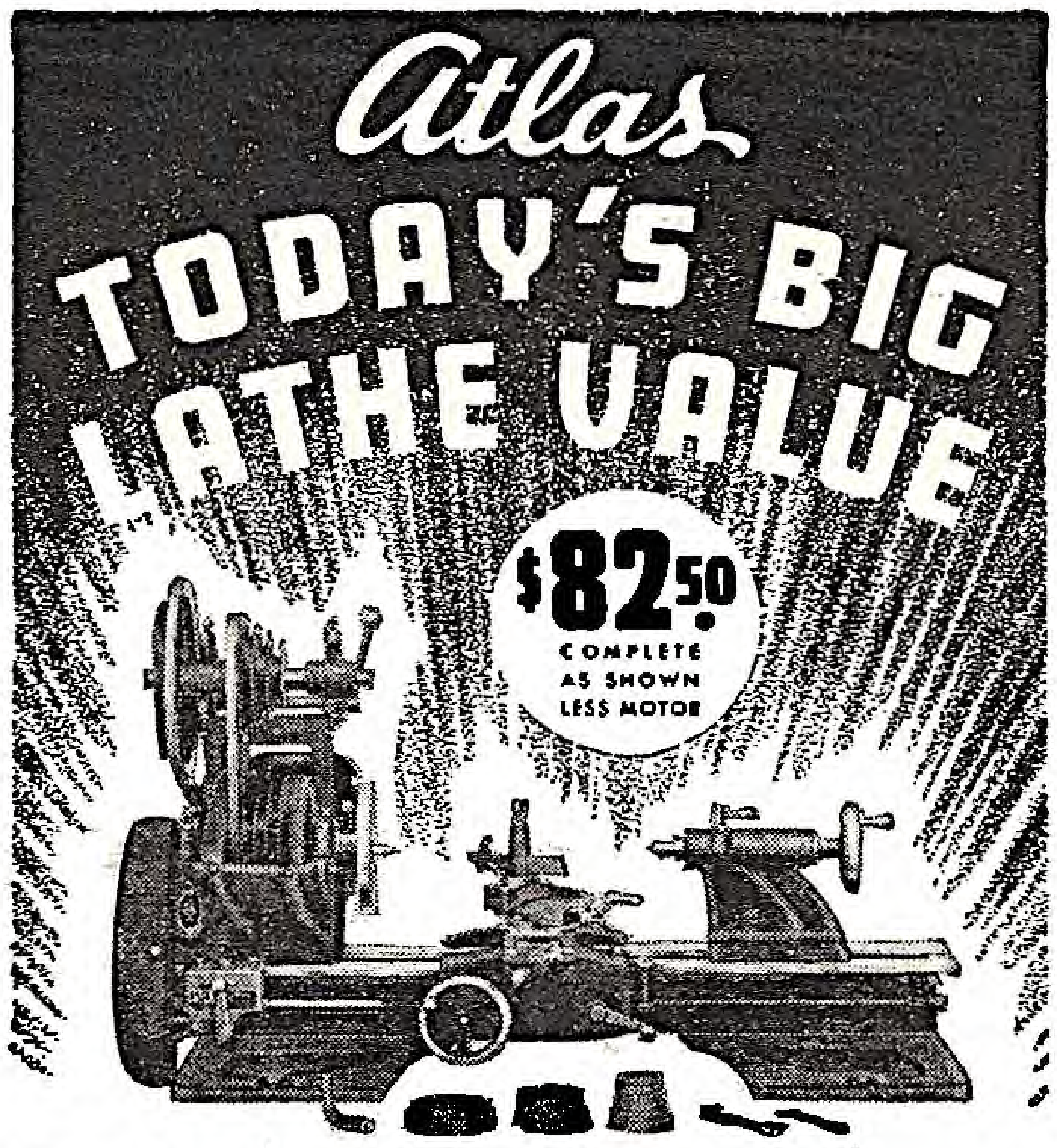

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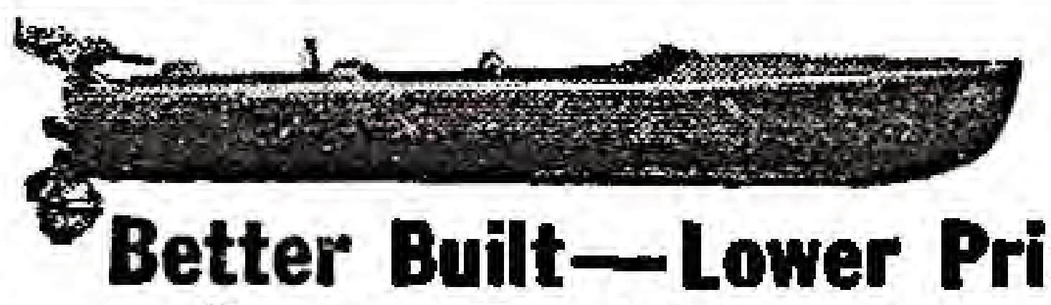

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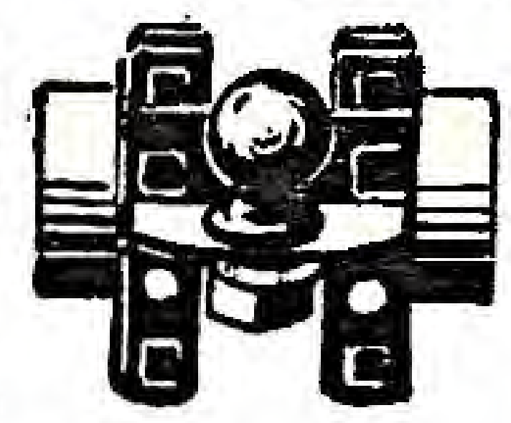

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Cookie Jar and Candy Tray

[*Continued from page* 95]

stead, after thorough sanding, the butt of an ordinary candle is held against the wood and played back and forth with some pressure. The wax melts and soaks into the wood fibers, resulting in an effect resembling an oiled surface. Since paraffin is odorless, no contents will later absorb objectionable flavors. Rubbing afterward with a soft rag removes surplus wax. A clear lacquer coat evenly placed on the outside, allowed to dry hard, then burnished with a soft cloth will give a good finish. Rub lightly with fine steel wool before applying the cloth.

For the lid, obtain a piece of gum the proper size and bore a $\frac{5}{16}$-inch hole half way through the center. Turn down a piece of waste to fit and glue in place then turn the whole lid and knob as one piece. Next turn the two buttons to the shape shown for the side handle supports.

The handle is made from a strip of wood about ⅛ inch thick and ¾ inch wide. Plane one or both sides after sawing. Close one end of a pipe with a pipe cap or wooden plug driven to a tight fit and fill it with water. Place the strip inside and put this in the furnace with the door open. Put the pipe to one side so boiling won't be too violent. After 5 or 10 minutes, the piece can be withdrawn

[*Continued on page* 144]

Where To Catch Big Fish

[*Continued from page* 75]

weeds, the small mouth is likely to hunt out the deepest spots in the lake, if possible around the bottom springs. If such can be located, it is possible to go there most any time and take fish.

The wall-eyed pike travels in schools most of the time, and is to be found in those locations in a lake where the bottom is studded with rocks. If not rocks, then where the bottom is gravelly or sanded. Not every fisherman is aware of the fact that the wall-eyed pike is a nocturnal fish. It has eyes for seeing in the dark, and feeds at night, in fact up to twelve midnight.

In spite of the fact that the muskellunge is one of our largest freshwater fishes it is not a deep-water fish. It will project itself into inset, lily-pad bays where it hides, head thrust out, waiting for its prey to come within convenient reach. It generally lies with its head just inside of the outer rim of the weeds and pads, which is a reason why you should make your casts up to the edges of the same. Most fishermen use the trolling spoon entirely in their musky fishing.

Like the muskellunge, the great northern

[*Continued on page* 132]

Asia, the Tinder Box of War

[*Continued from page* 43]

the enemy lines. It is reliably reported that Russia has 600 bombing planes, 300 of them at Vladivostok, capable of striking at the very heart of Japan within three hours after such an attack may be ordered. Meanwhile, other hundreds of bombers, combat and pursuit planes are based near Lake Baikal and other military aerodromes all the way from Vladivostok to Afghanistan. Some 300,000 workers are now engaged in railway and highway construction in Siberia and they are well equipped with the best of tractors, power shovels, track-laying equipment, etc.

Navies Have Unimportant Part

Aside from submarines, Russia has no navy comparable to that of Japan, while Japan has a navy second only to those of Great Britain and the United States, but she might as well scuttle it for all the advantage it is liable to give her in a war with Russia. Russia has no extensive commerce in the Pacific. Her Arctic seacoast is mostly ice and the rest of it is on the Black Sea and the Baltic. Such inland seas are death traps to a battle fleet in time of war.

When Japan moved into Manchukuo in 1932 there were 6,227 kilometers of railways in operation with service notoriously bad. Today Manchukuo has 9,080 kilometers of railways and the service is better than in Japan, China or any other part of the Orient. Oddly enough, all these improvements, like those of the Russians, converge to no advertised purpose upon Inner Mongolia and the Northern Chinese frontier. Japan now has almost as many troops along the south side of the Siberian frontier as Russia has to the north. "Border incidents" are being deliberately provoked and whenever reenforcements of Japanese troops move in to "restore order" they never leave.

Russian War Birds Surpass Japanese

Another tremendous factor, the unknown equasion of any modern war, is what is liable to happen in the air. Young Russians take to the air like fledgling eagles while it is a rare Japanese who can ever be trained to become a competent aviator. The effectiveness of a military air force is greatest when it can be used against a closely built-up industrial nation. Japan is such a nation and it lies within easy striking distance of a dozen Soviet air bases in Siberia.

The war-mad military leaders of Japan, who have never for a moment doubted the invincibility of their army and navy, are determined to have it out with Russia at any price. The preparations for war have already gone so far it is now questionable if either nation could turn back if it would.

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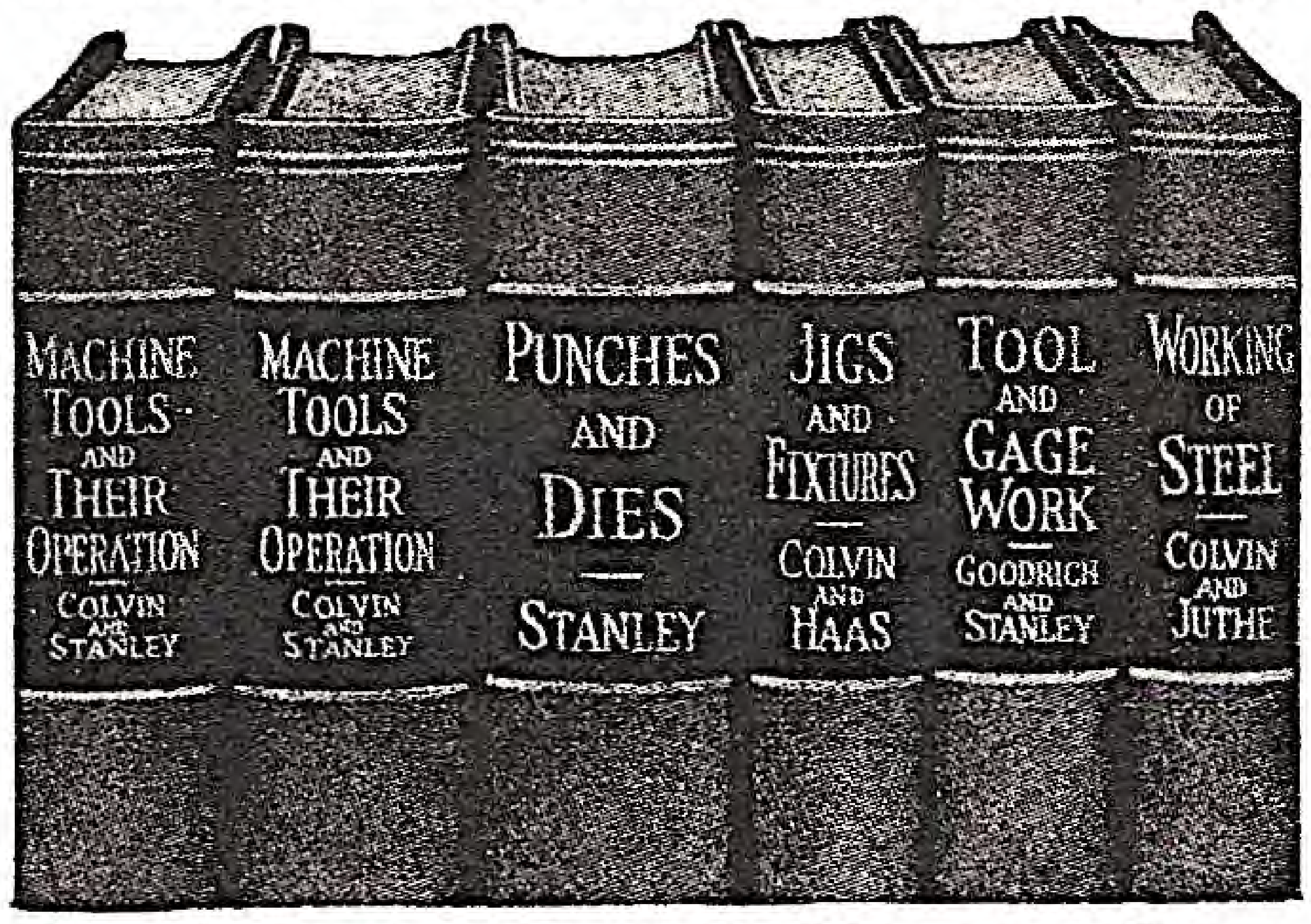
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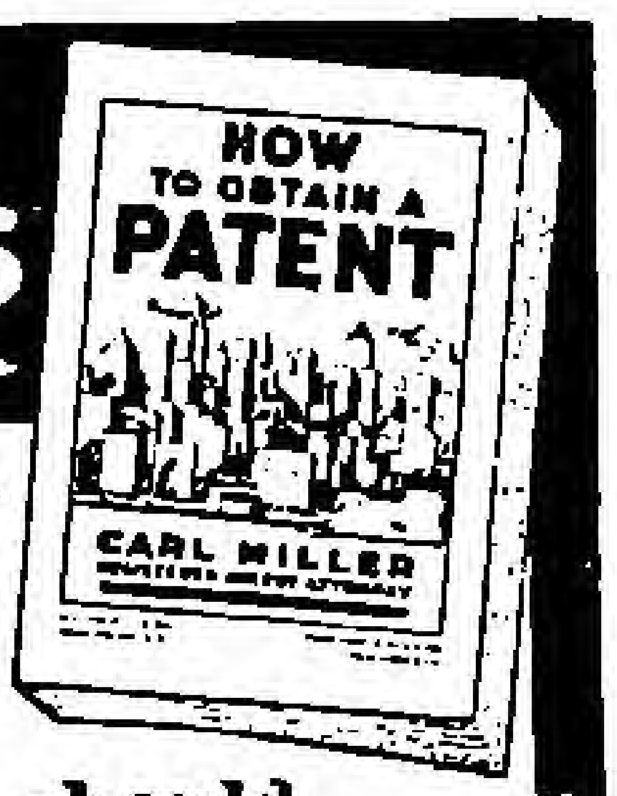

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Soapbox Graduates Build Racers

[Continued from page 85]

hauser weighs 230 lbs. The Elto head is set on a box shown in the photos and the bolts which would normally bolt to the lower propeller unit housing are bolted to the box. Then the water connections and the ignition is hooked up.

The gear box itself is simple. It is an oblong aluminum box under the power head. A bevel gear takes the power off the motor and reduces the r.p.m. to ½ on the propellers shaft. The propeller shaft, or transmission shaft, has a spline on it on which slides the cup gear of a Chevrolet transmission. On the free end floats a Chevrolet high gear. The cars are started rolling by pushing them, and after they get going, the whole job is clutched and de-clutched by sliding the cup gear on and off the high gear pinion. There is no other clutch. The motor speed and the rolling speed are adjusted with the accelerator pedal, and the gears mesh without clash. Grease, 600-W, is used for transmission. The stub shaft with the high gear pinion is equipped with a Model T universal joint and housing and this runs back to the differential.

[Continued on page 130]

First Cash Prize Winners Announced

[Continued from page 77]

heel for women's shoes lies in a metal, heel-shaped shell into which can be inserted a rubber plug. As the heel wore down, a fresh surface would be supplied simply by screwing the plate down with the key.

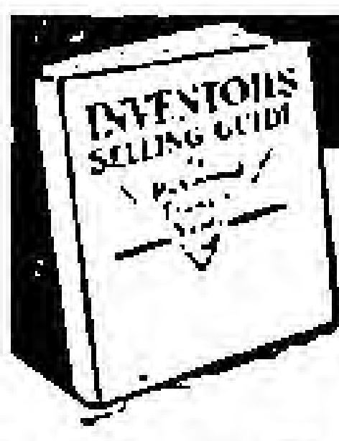
There are three fourth prizes of $2 each. They go to Louis La Grange of Allegan, Mich., Charles Lada of Detroit, Mich., and Floyd Hassel of Bellport, N. Y.

The four fifth prizes of $1 each go to Ernest Johnson, Idaho Falls, Idaho; Carl Rasmuson, Rockwell City, Iowa; John Kotowicz, Westfield, Mass., and Willis Nielson, Waukegan, Ill.

Read the rules below and then send in your suggestion for the most needed invention.

RULES

1. In 100 words or less explain your idea for a needed invention.
2. This contest is open to everyone except employes of Modern Mechanix Publishing Co., and members of their families.
3. You don't have to buy a copy of this magazine or be a subscriber to enter the contest.
4. Write your name and address plainly on your entry. No entries will be returned.
5. The editors of this magazine will be the judges. Their decisions are final.
6. Mail your entry to Inventions Contest Editor, Modern Mechanix Publishing Co., Greenwich, Conn. Entries for this month's contest must be postmarked on or before May 1, 1936.



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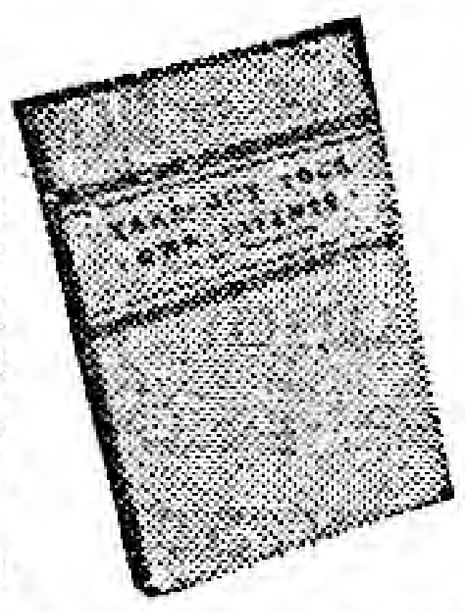

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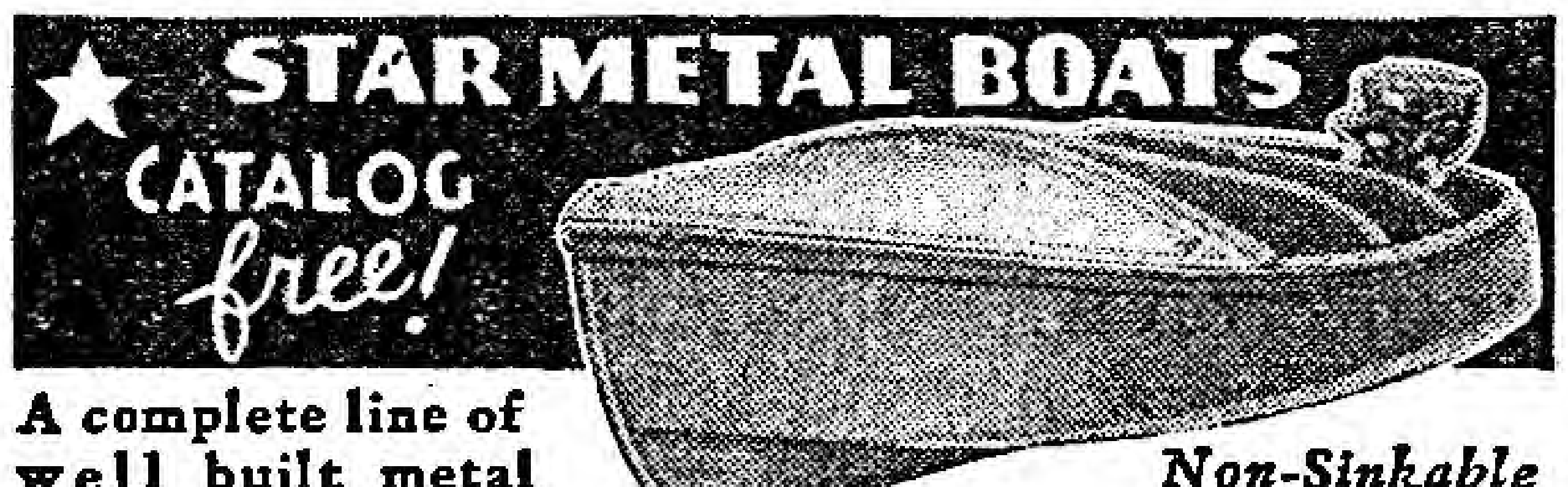

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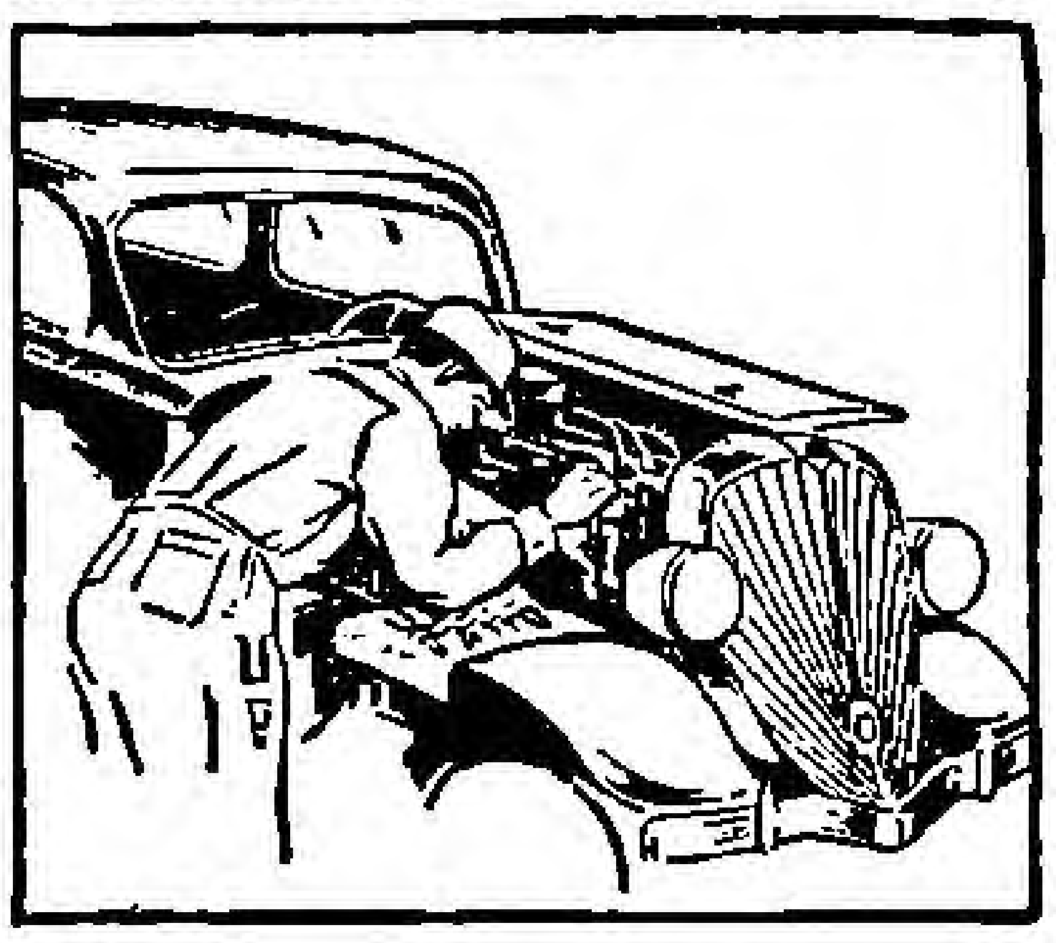

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The Umpire Never Sees The Plate

[*Continued from page* 65]

seeing another on which he must render a decision. A lightning exchange of signals will bring help from the other umpire, who was perhaps better able to see what happened."

There is a common saying that in case of a tie in a force play the umpire should favor the runner. That is not strictly true. The runner is under no compulsion to beat the throw, but the ball must arrive *before* the runner. If they arrive at the same time an out has not been made. Actually there are very few ties.

The trick is to get in such a position that you can see daylight if the runner's foot is only an inch or so from the bag, then watch the bag and listen for the sound of the ball as it strikes the baseman's glove. With two senses working together it is possible to tell whether the ball or the runner arrived first.

With the score tied, a man on third, and not more than one out, a sacrifice fly is the logical play. The important thing for the base umpire, then, will be to make sure the runner does not leave third before the ball is caught.

With the bases full and only one out, the umpire knows the defensive team will try for two, so he gets into position to see the start of the double play, and then runs toward first to watch the relay. The first out will seldom be close—the second is almost sure to be.

Soapbox Graduates Build Racers

[*Continued from page* 128]

The master gear is a 40-tooth, with the pinion 12-tooth. This brings the overall ratio to 6.66 to 1. On the four-cycle cars, used on larger tracks, the ratio is 4.80 to 1.

On the end of the gear box I install the water pump off a Hisso airplane engine. They are light, throw a good stream of water, and do away with the need for a fan. The radiator is a 12"x18"x3" honeycomb shell.

The body is of aluminum, with the gas tank, holding about 3 gallons, just behind the driver's seat. An air pump, with a lead off to the dashboard, is used to pump gas to the carburetor. This is done by using the pump to pump air, and the air drives the fuel to the carburetor bowl. The lead to the dashboard is to an oil gauge, which is used for a pressure gauge. Usually 1 to 2 lbs. pressure is plenty, but for quick acceleration you have to get gas to the carburetor in a hurry. When you are going one-fifth of a mile in 15.2 seconds you need fuel to move you forward—this figures out at about 65 miles an hour. Fast going!

The body is hammered out of 20-gauge aluminum, and a varnish enamel finish sprayed on. The seat is upholstered by a professional and the car is ready for the engine. I have used an Elto successfully.

Television—Next Industrial Boom

[*Continued from page* 123]

that, where they impinge upon the anode, they would form an exact duplicate of the original light image if they could be seen.

The anode is pierced by one tiny hole (scanning aperture) whose width and height are 1/343 of that of the scene focused on the cathode. At every instant the rays or flying electrons from some tiny part of the scene pass through this aperture into an electron multiplier where they are amplified and produce a signal current which can be transmitted to the distant receivers. When the rays are bent, the electron image sweeps over the anode, producing the same effect as if the aperture had been moved over the image, that is, electrons from successively different points on the scene are picked up.

Electron Image Sweeps Over Anode

Thus, to scan the scene, the electron image is swept back and forth and up and down over the anode in such a way that the aperture scans 343 lines across the image every 1/30 second. This is accomplished by passing alternating currents of saw-tooth wave form through the coils at the sides of the dissector, whose magnetic fields pass through the tube and bend the rays. The current which deflects vertically alternates at 30 cycles per second while that producing the horizontal swing alternates at 343x30 or 10,290 cycles per second.

The fluctuating electron beam from the image dissector is then transmitted to an oscillight tube, which is the Farnsworth receiving device. The impulses arrive at the tube and are shot from an electron gun against a fluorescent screen, where the electron bombardment becomes visible to the eye as light. Since this light varies in intensity exactly as it did in the optical image scanned in the Image Dissector, we have a visible picture full of detail.

Image Is Green, or Black and White

As it appears on the receiving screen, the image is pale green or white, illuminated so brilliantly that a darkened room is not necessary to view it. If desired, the image can be reproduced in black and white by varying the nature of the fluorescent materials employed. Cost is the determining feature. Probably all will be white reproductions.

Most of us are familiar with the principle of motion picture projection, in which a series of still pictures is thrown on and off the screen so rapidly that the retina of the human eye fuses them into one continuous picture with the illusion of motion. This is exactly what happens in the television receiver, except that each separate picture, instead of being pro-

[*Continued on page* 135]

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The Kentucky Derby

[Continued from page 51]

curves—it costs ground to pass, and it may be ticklish business to swing around flying heels. And if the field is large, one or more of the horses which broke slowly from the start may be pocketed, hemmed in by slower horses.

By the time a colt becomes two years old, and is ready to enter racing, he already represents an investment of several thousand dollars: the cost of his breeding and the expense of the stable where he has been cared for and trained.

Each year, from 100 to 175 of the horses which showed greatest promise as two-year-olds are nominated for the Derby. Of that number, from 12 to 23, the cream of the lot, are left in the field by Derby Day.

Years of planning, hard work, the dreams of lifetimes, and fortunes run together in an ecstatic moment. The starter's bell rings, and there comes the hoarse roar of the crowd: "They're off!"

A minute later, the stoutest-hearted thoroughbreds swirl into the stretch—a fleeting tableau of glistening satin and straining sinew.

That's when your class tells—when the best horse unleashes the speed and stamina which is his by blood and training, pulls away from the field and hurtles past the finish line.

Where To Catch Big Fish

[Continued from page 126]

pike likes to haunt the deep inset bays that are likely to be filled with pads and weeds. If you would have your best luck taking really large specimens in this species visit deep bays in the early morning and make your approach with the greatest possible caution. They will take a frog in preference to any other lure.

The three members of the pickerel family, most of which are found in the East, namely, the chain pickerel, the brook or little pickerel and the banded pickerel, also haunt the pads and weeds.

Large brown trout are found almost always in the pools. Always fish for large trout at a distance of seventy-five or more feet, allowing the lure to drift down. Rainbow trout you will find ninety per cent of the time out in the center of the stream. Brook trout, while found in most parts of the stream, seem to be particularly prone to be lying beside boulders, and beside logs and obstructions in the stream, the same forming a break against the swift water.

Little springs, rivulets and small streams flowing into a large stream are always attractive to the game fish.

"Cruisemite"—Ideal Trailer Home

[*Continued from page* 124]

with airplane dope, after which the roof is sprinkled with aluminum powder.

The dope will hold the muslin to the ceiling although a few tacks will be needed at the edges to temporarily hold the muslin in place. Dope a few coats along the outer edges first, allowing a good three to four hours in the sun for drying, then do the balance of the roof.

Now for the outside ceiling, which completes the work. The water tanks and the piping for the shower have been put in, and you are ready to finish up the job. This is merely a matter of doping the right size panels to cover the frame, laying it on with good thick casein glue, which holds like grim death, and prevents body squeaks. Use No. 8¾" chromium head screws set in piano washers for this, spacing about centers about 9". The seams of the panels should be joined on a jointer, and not left rough as they come from the saw. It would be well to fill the seam with casein as the panels go on, wiping off the outer edges immediately with a damp rag.

Fill Seams With Marine Glue

On the bottom and at the seam where the roof meets the side, put ½ oval aluminum stripping. At the roof, there will be an outgage caused by the crown. Fill this with Jeffery's C quality marine glue, applying hot from a squirt can. The can will pay out enough to make a full seam. Keep a can of turpentine and a rag handy to enable you to avoid sticking up the job. Marine glue must be put on hot, and all slop-overs wiped off immediately. The heating can be done in a pot of boiling water. Keep the glue away from all flames. A bead of glue should also be run around the edges of the ventilators.

A few coats of good spar varnish are applied both inside and out as there is nothing so weather resistant.

The skirt molding is put on, and the trailer is finished except for the interior joiner work such as drawers and closet doors. The hitch is a good ball and socket type. There are many ways of installing these, but it has been proved best to do it, using both welded joints, for rigidity, and bolts for security. You cannot afford to have a failure occur here. The ball end and the details of this part of the hitch must be taken from the car itself. Fasten the ball hitch to the car frame, and NOT TO THE BUMPER.

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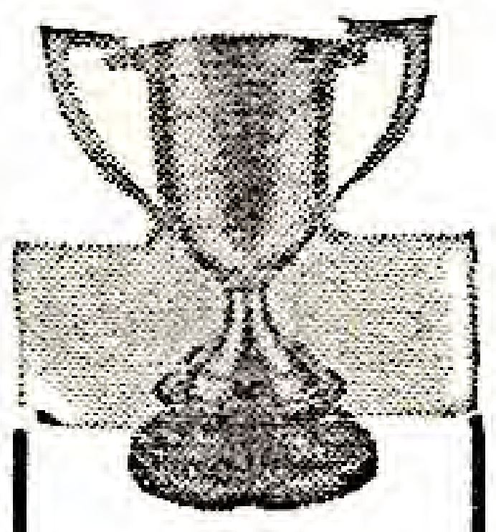

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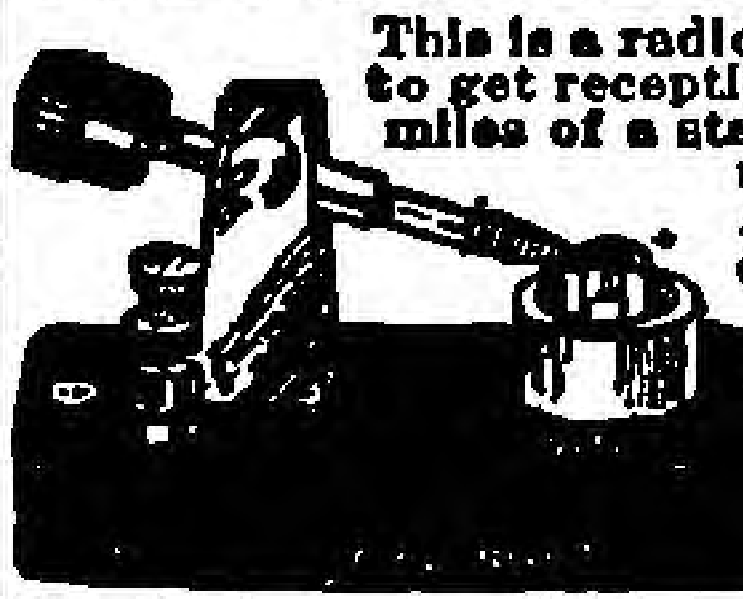

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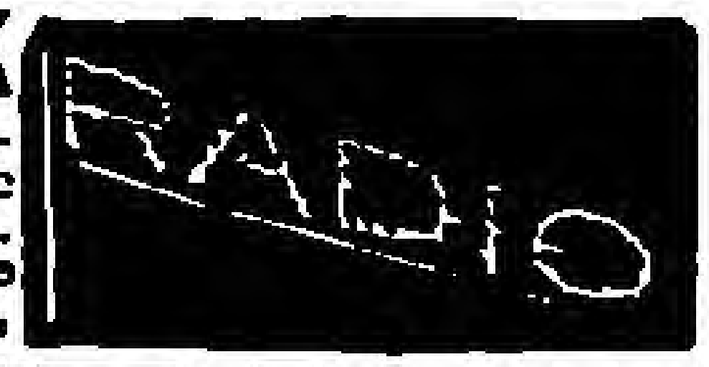

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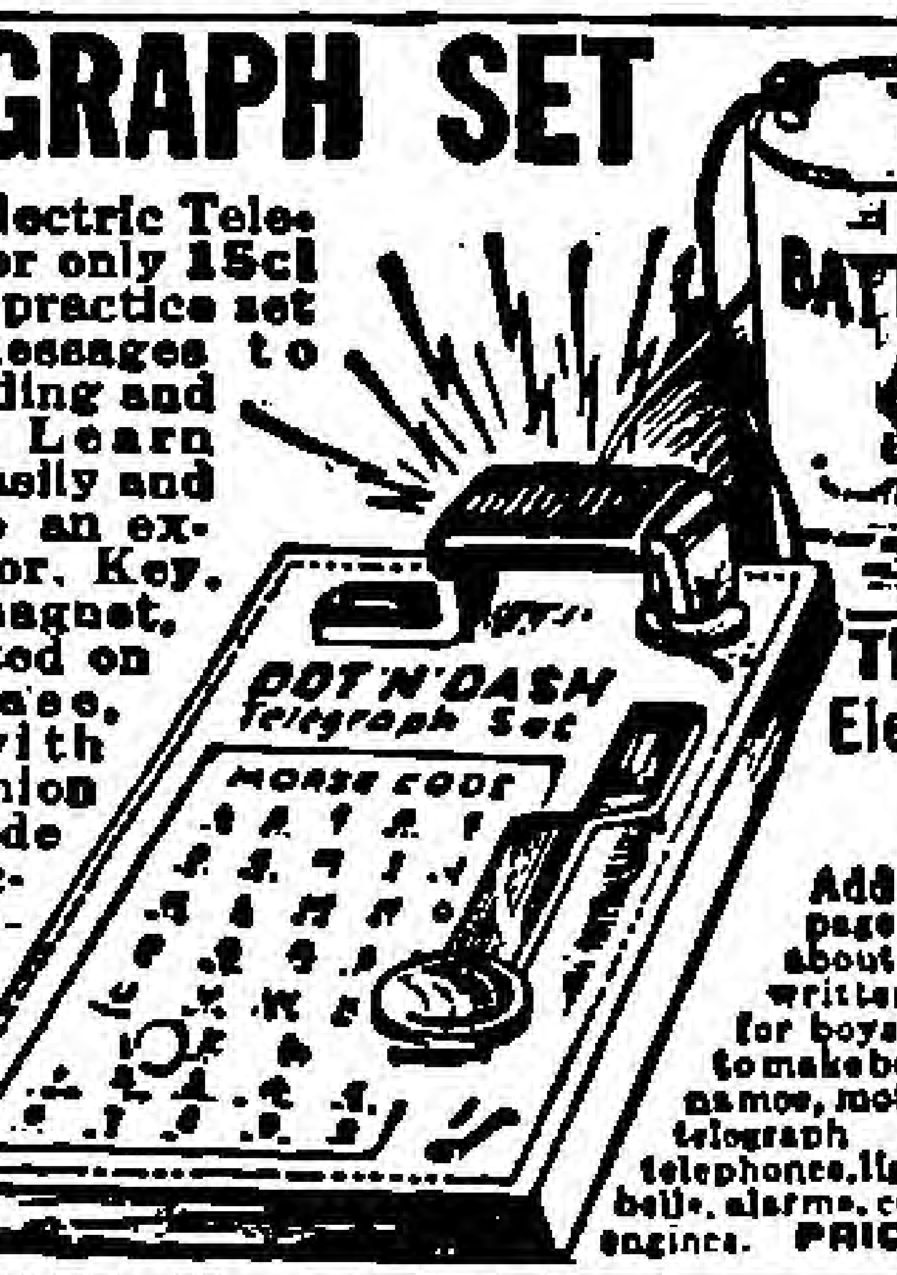

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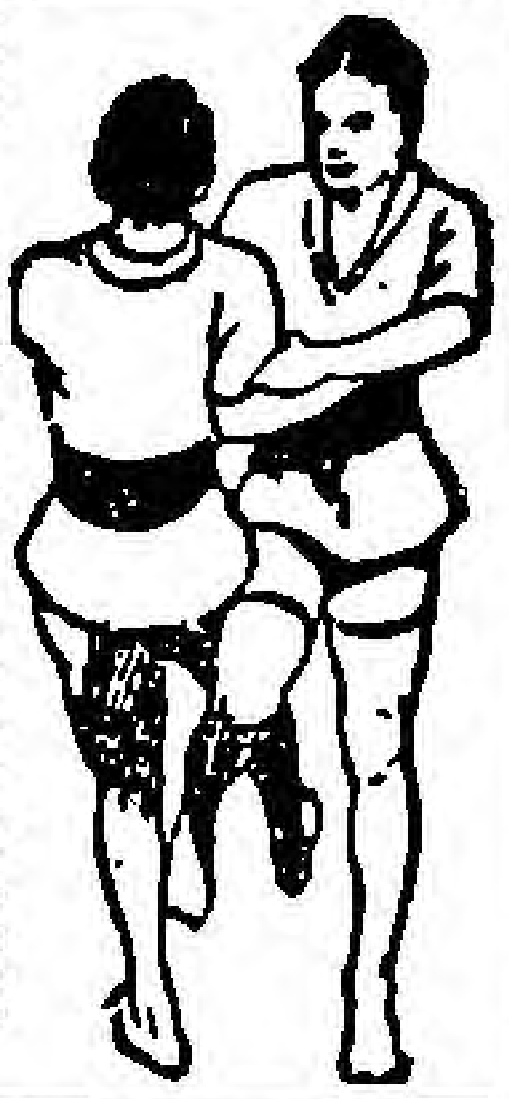

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BANG
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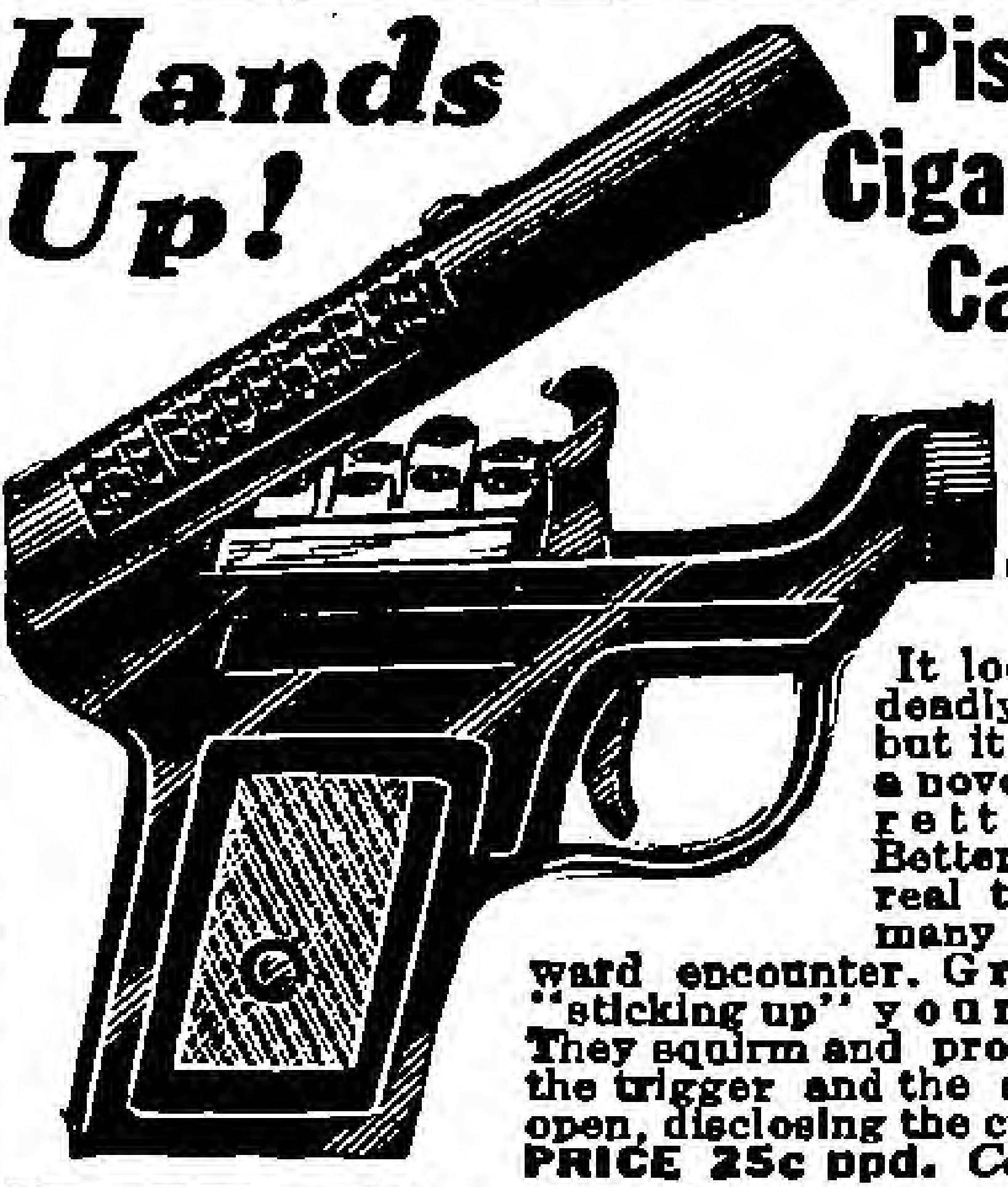

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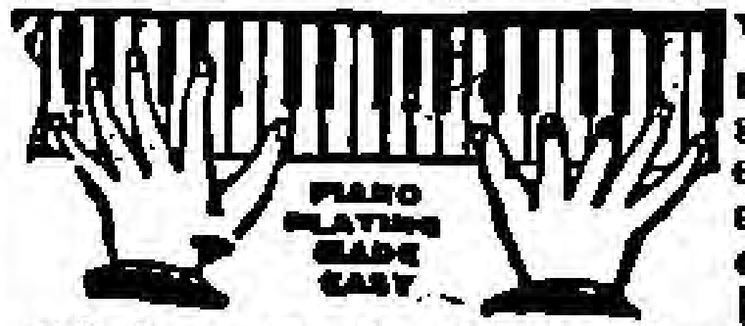

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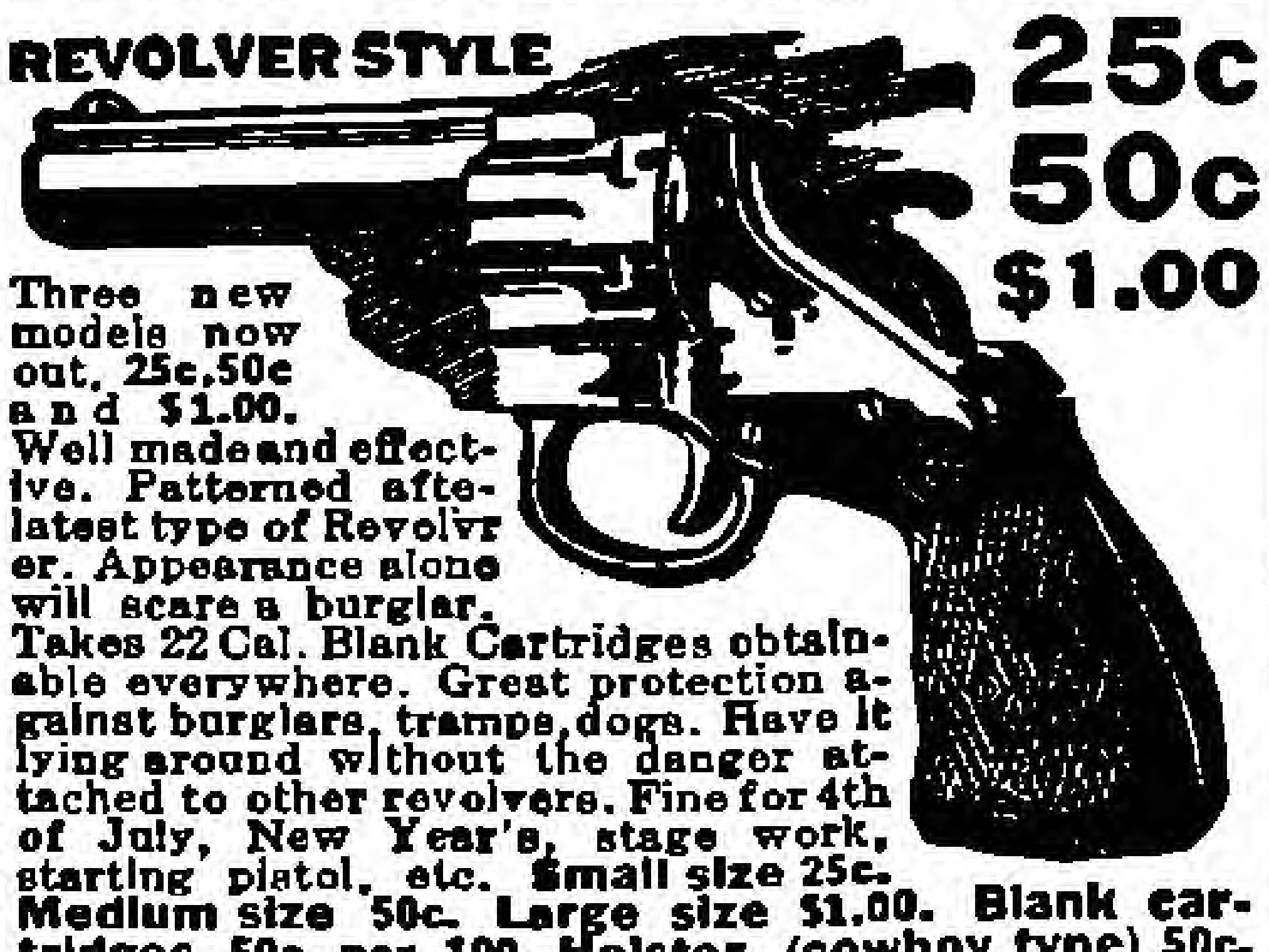

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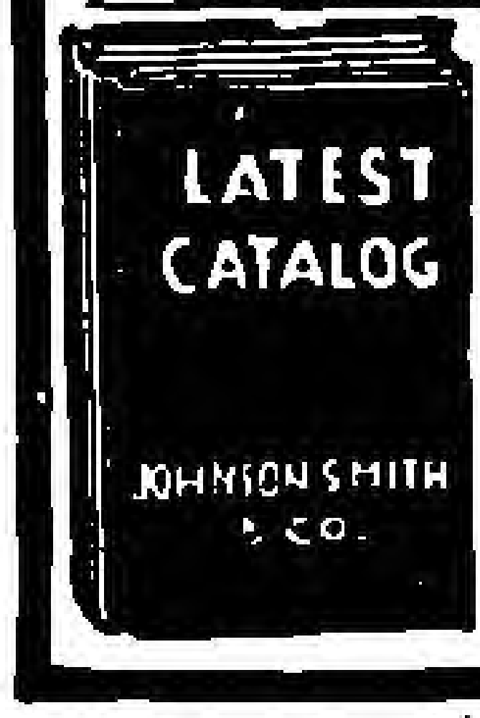

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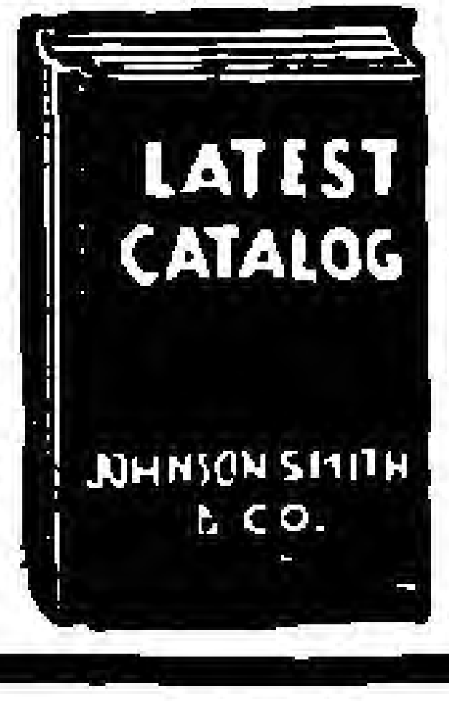

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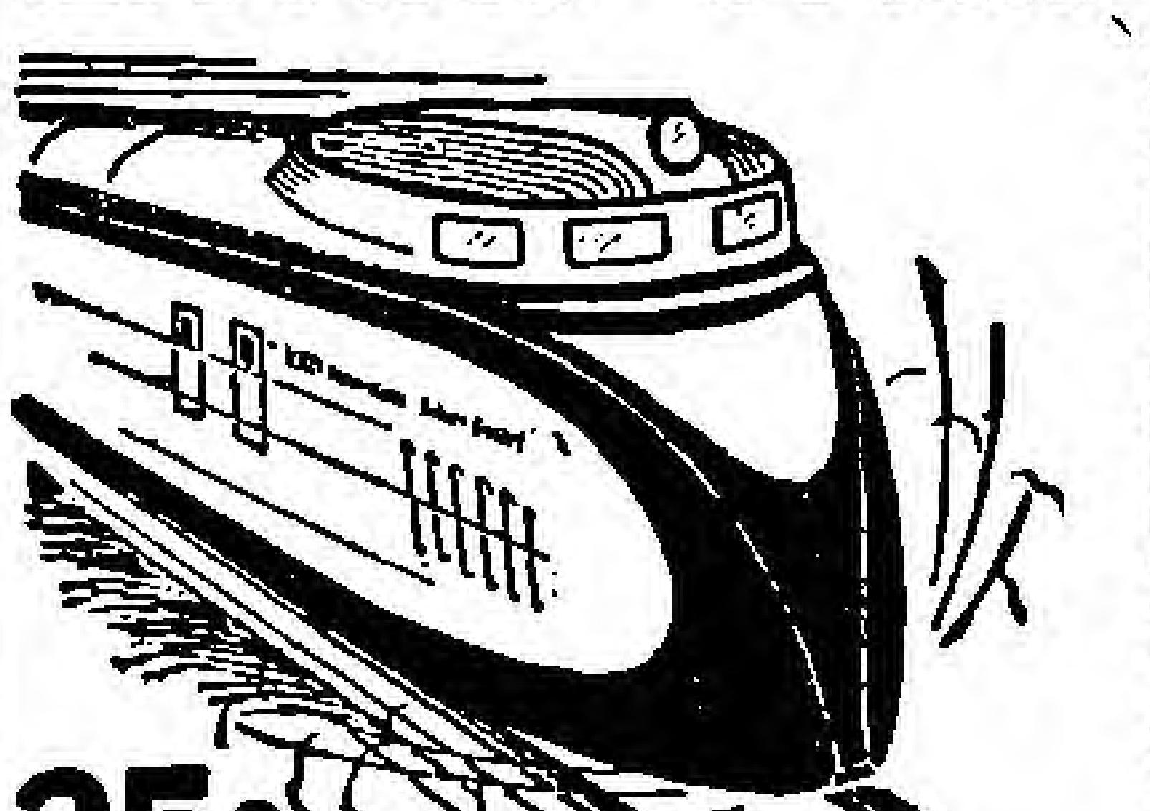

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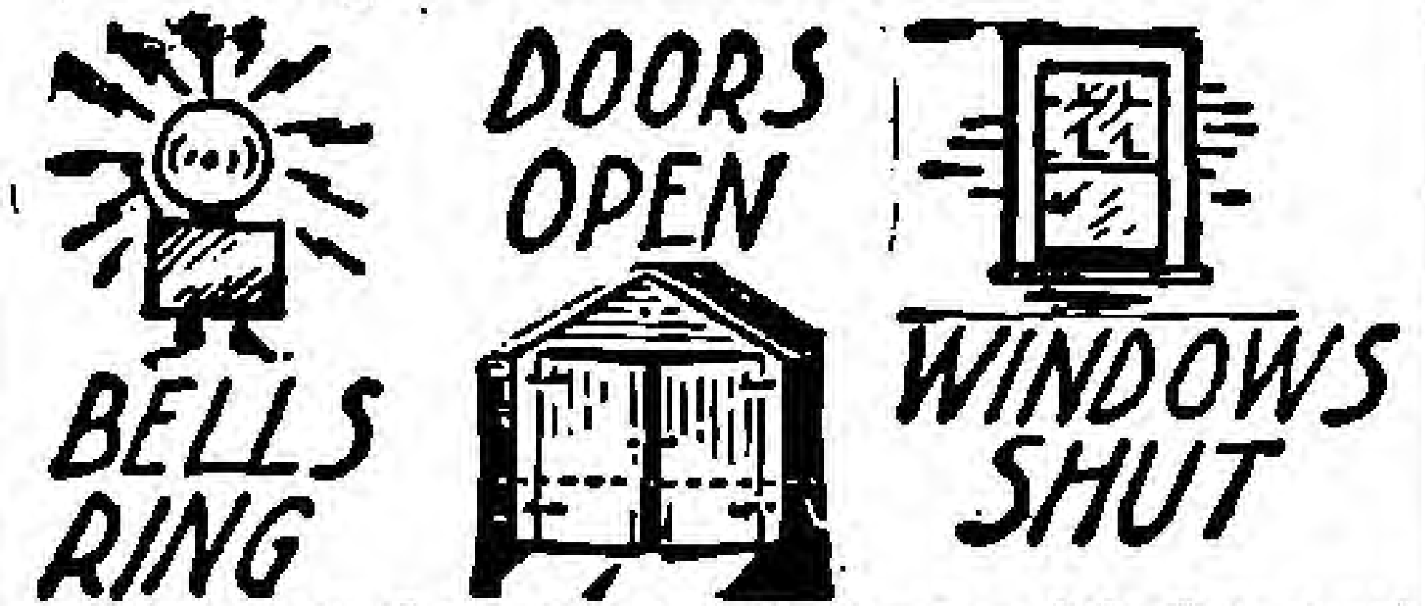

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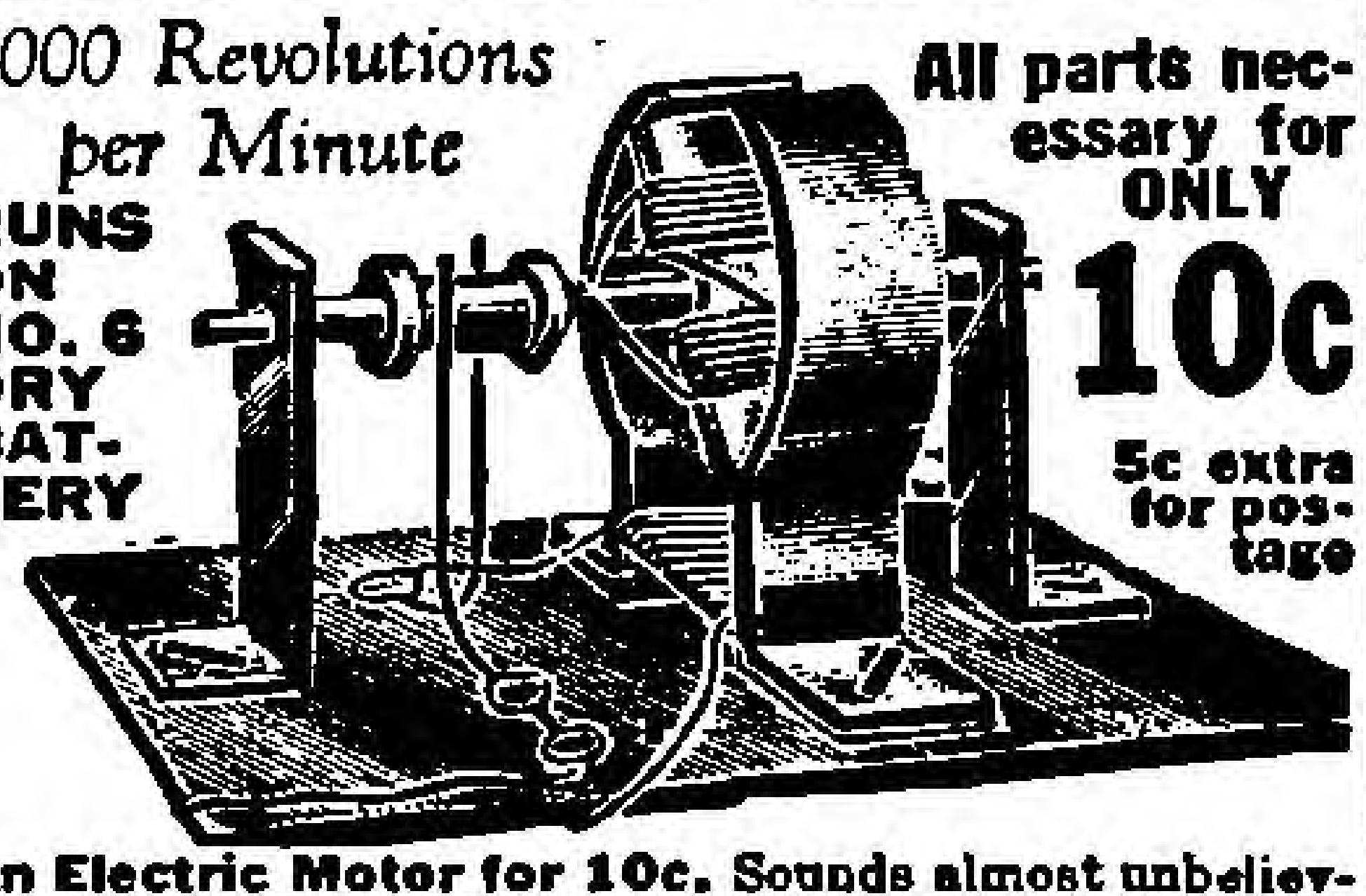

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Television—Next Industrial Boom

[Continued from page 131]

jected as a whole, is literally constructed of a hundred thousand points of light placed side by side, like a bricklayer building a wall—and all in a thirtieth of a second!

The most recent Farnsworth development has been patented under the name of the Multipactor tube. This is a startling vacuum tube which multiplies current at such a speed that if it continued for as brief a period as a single second, it would pass more current than all the Niagaras and all the power plants in the entire world! Each one hundred millionth second it multiplies current five times.

Of course, in the Multipactor a state of balance is maintained and the runaway power kept under control. Its importance to television is that it is expected to make possible the use of cold cathode receiving and transmitting tubes.

Official confirmation of the imminence of television is found in the recent action of the Federal Communications Commission in authorizing the laying of a coaxial cable suitable for television transmission between New York and Philadelphia. Construction must start before July first.

It's the first reverberation of a gigantic boom—proof that Mr. Farnsworth's prediction of an imminent television explosion is already coming true. The new cable may very well be the spark that will set off the big explosion!

Uncle Sam Battles Dust and Floods

[Continued from page 62]

"The men have been in the field every work day when weather conditions permitted. This section has received very little moisture this winter, but has had some very severe dust storms which made field work impossible at times. A severe wind and dust storm in March blew over the stakes and the markings were cut off by the dust, even the hedge posts were polished as if with sand paper while dust was drifting across roads. During another dust storm it was impossible for us to see for more than ten feet in the daytime."

But it took two major disasters—the floods in Pittsburgh and Hartford to bring the problem home to Congress and the people. Now the law makers can be expected to act. Legislation was proposed in March that would give the Federal Government control of the Missouri River Valley in so far as flood protection was concerned. Already Representatives from flood-ridden States of the East are urging that similar legislation be enacted to protect their section of the country. Today all signs point to action.

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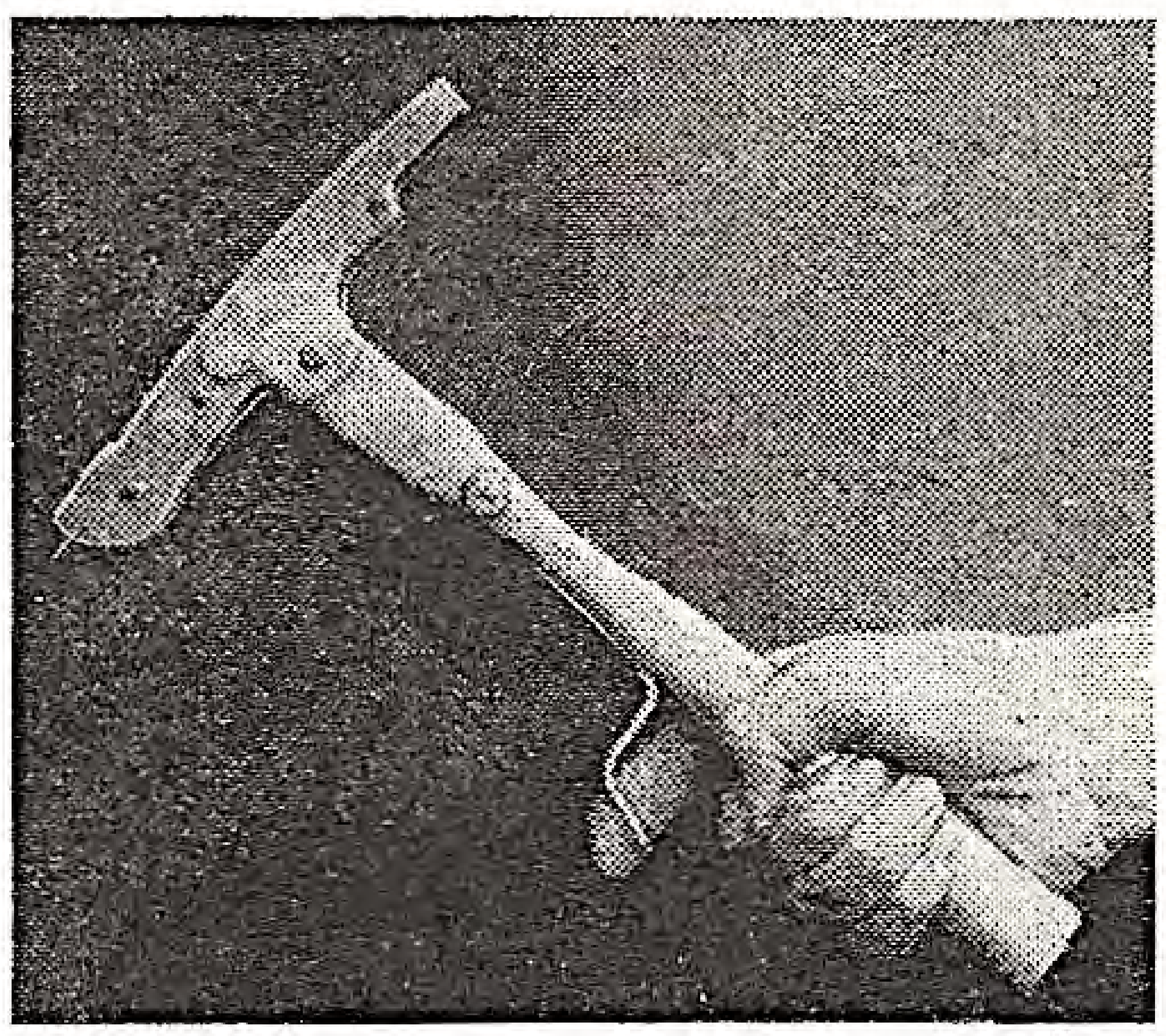

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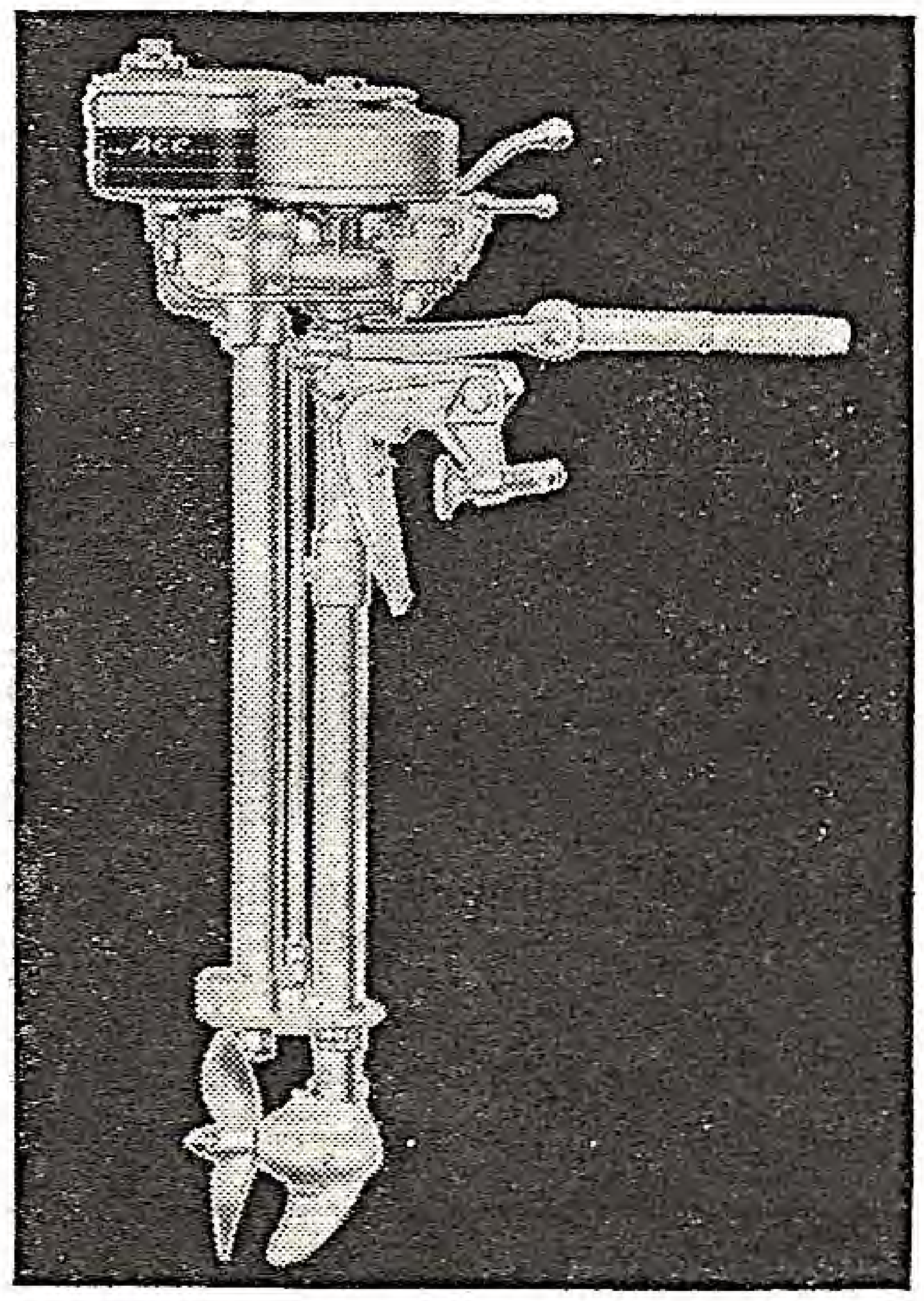

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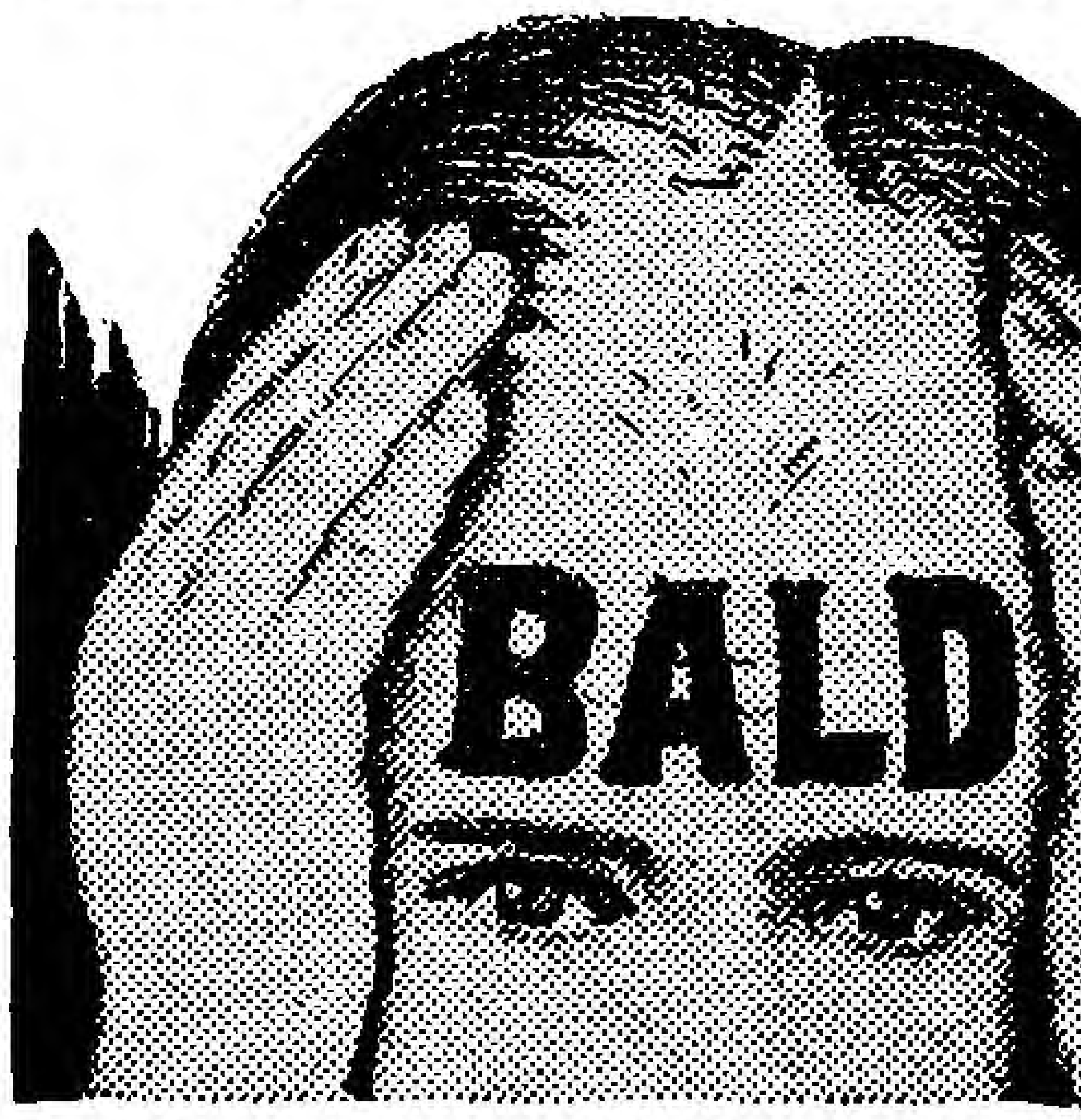

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Now a new method enables people who have dandruff, falling hair, thin hair and baldness to easily remove the congested, thin outer layer of scalp skin. This permits opened pores and follicles to absorb air, sunshine and a blood-stimulating compound to activate the smothered, dormant hair roots in promoting hair growth as nature intended. It is all explained in a new treatise called "HOW HAIR GROWS," showing anatomy of your hair and tells what to do. This treatise is now being mailed FREE to all who write for it. Send no money, just name and address to Dermolav Lab., Desk 123-C, No. 1700 Broadway, New York, N. Y., and you get it by return mail free and postpaid. If pleased, tell your friends about it.

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Build Models of Racing Planes

[*Continued from page* 124]

carefully to see how the stringers lie at the tail post before gluing them and trimming off flush with the tail post. Now sand down the entire framework, removing any inequalities or slight deviations from alignment.

Cover where indicated with 1/64" sheet balsa to simulate metal cowling. Note that where cooling slot occurs a small former (Fig. 1) is used each side to brace the engine cowl where it projects over the under cowling. Work the thin sheet balsa fast, holding the sheets in place with rubber bands while the cement is drying.

Cut out all the parts as called for on the page devoted to the wing drawings. Wing assembly should start around the heavy $\frac{5}{16}''$ square leading edge which is pinned in place unshaped and ribs, spars and wing tips assembled directly to it.

Cover the wings with care after making the aileron hinges and cover both wings and ailerons as one unit, separating them after covering. Paper the bottom of the wing first starting at the fuselage end of each wing and working rib by rib towards the tip. As glue sets between ribs, hold the paper tightly for a moment as it dries, then bend it back and cement the next section, and so on, using tissue cement for this purpose.

Cabin Made of Celluloid

Build up the cabin covering from three pieces of celluloid. Full size pattern is provided for the forward section of the windshield. Cut out pieces to this pattern and glue them in place to the wire frame and to the former strips using cement sparingly on the celluloid. Paste green paper strips over the edges to simulate metal framework and dot with silver rivets to heighten the effect. Place dummy gas cap in position and add other cowling details shown on the plans.

Finish model by steaming lightly to tighten paper and, when thoroughly dry, apply green lacquer dope over entire model.

Installing the Propeller

Propeller and rubber motor are now attended to. Although not essential a free-wheeling connection is recommended. A simple type is indicated in the drawings but this detail will be gone into more thoroughly in the second installment of this article. The spinner assembly will also receive more attention in the ensuing article. A hardwood nose plug must be made and the propeller mounted on a No. 12 piano wire rubber hook which is first threaded through the nose plug.

Kits for this model may be obtained from Modern Mechanix Publishing Co., Greenwich, Conn., at $2.50 each. Write for price list if parts only are desired.

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Sample set 29c Dozen $3.36

No. C264. Leather Ties. Smart, durable, washable. Comes in assorted patterns. Made to last. Sells for 65c.

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No. J305. It is attractive and will provide hours of enjoyment. Has 14 reeds, nickel plated covers. Available in most popular keys, such as: A, C, G. Each in a box. Sell for 15c.

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No. M210. Genuine steerhide, tooled design, laced edge billfold. Has compartment for currency, stamps, cards, etc. Very attractive and useful. Sell for 60c.

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Cookie Jar and Candy Tray

[*Continued from page* 126]

and bent around a form of the right diameter. A piece of wire bent properly will hold the strip ends in place. To speed up drying you can put strip and form in the kitchen oven with the heat turned down low. Within 10 or 15 minutes the strip will have attained its new shape with all the rigidity it originally had when straight. With a sharp knife or sander reduce the handle width to about $\frac{9}{16}$ inch. The holes for the pins are carefully bored to prevent splitting. The final assembly comes with gluing the pins in place as shown.

Fundamentally, the handled tray is made in the same way. This is turned from a piece of walnut 1¼ inch thick and shows how much an otherwise ordinary job takes on new allure by the addition of the bent handle. Since this is also turned on the small, center screw face plate, a slight raise at the center of the bottom prevents exposure of the screw tip. This permits giving greater depth to the piece. The side pins are of slightly different design and the handle is somewhat narrower, but steamed and bent to shape in the same manner as described for the cookie jar.

Lieutenant-Commander Martinek

[*Continued from page* 59]

creator of a popular cartoon character.

Lieut. Martinek's life story is as amazing and adventurous as that of Don Winslow, his cartoon hero. He has been a Naval Intelligence officer, a detective, a G-man, and is now an important oil company executive as well as cartoonist.

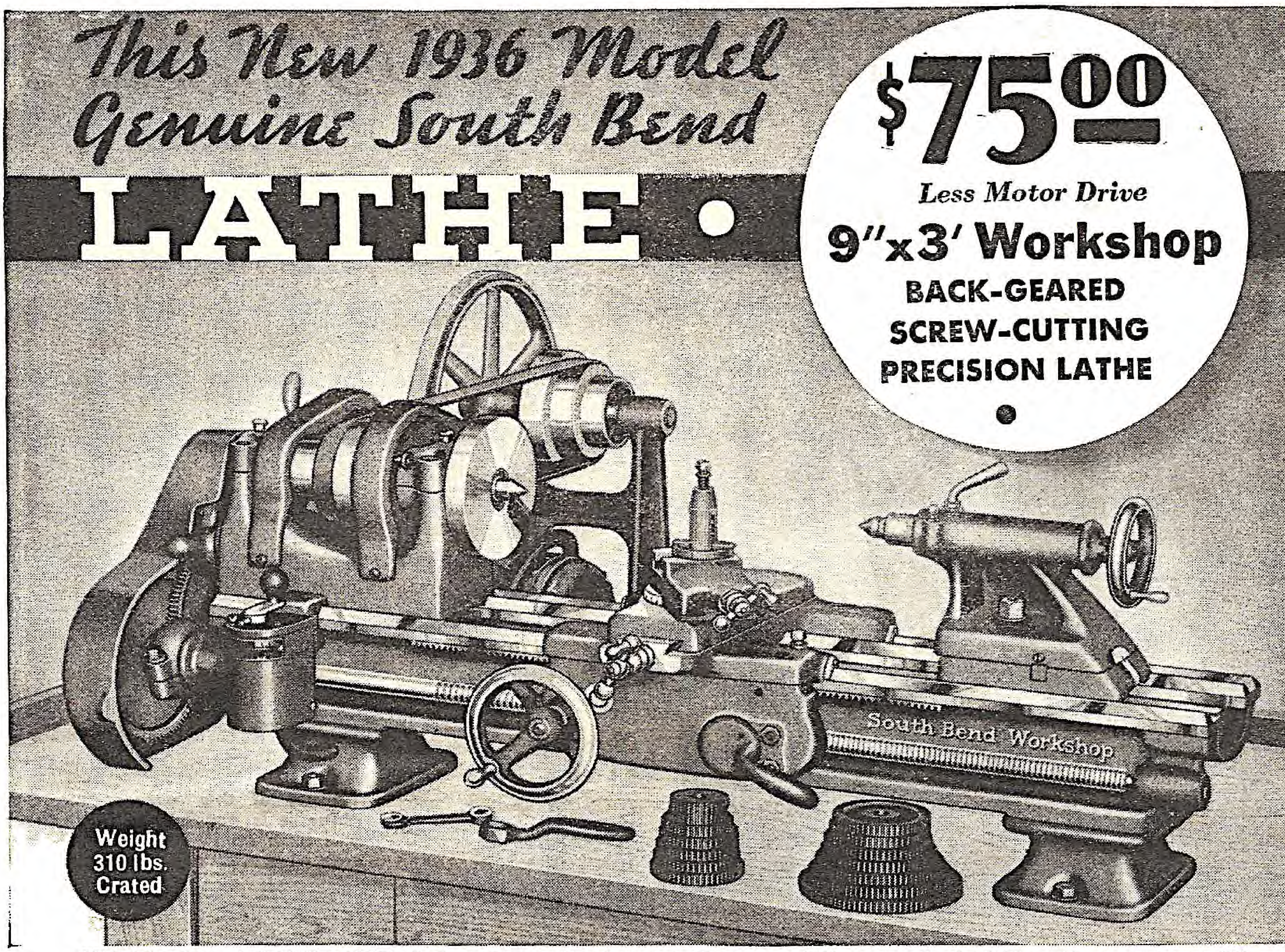
"In 1917," he said, "I was hustled off to Washington to organize the physical, chemical, and photographic laboratory for the Office of Naval Intelligence. A year later I was sent to the Far East as Fleet Intelligence Officer. That's when the fireworks started. But I loved every minute of it. Sympathetic inks, messages pricked in code on the quills in carrier pigeons' wings, plots to destroy important U. S. Naval bases—all these I am reliving through Don Winslow, who follows pretty closely in my own footsteps."

This wartime experience in fighting international intrigue led to a job as Special Agent in the U. S. Department of Justice after the war—a G-man.

At present he is preparing to dramatize the adventures of Don Winslow in a radio program, and he has already completed the first of a series of books with Winslow as the hero.

All this astonishing success has been won in little more than a year. Few businesses offer more rapid opportunities of rich reward than cartooning—a romantic high road to fortune for the man with an idea.

This New 1936 Model Genuine South Bend LATHE



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BACK-GEARED SCREW-CUTTING PRECISION LATHE

NEW 1936 model 9⅛" x 3' Workshop Bench Lathe with Horizontal Countershaft, ¼ h.p. Reversing Motor, Reversing Switch and Belting as shown....... $98.25

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THE *new 1936 model* 9-inch Workshop Lathe swings 9⅛" over bed and 5½ over carriage. The hole through spindle is ¾" and will accommodate collets up to ½" capacity. The 3-foot bed size takes 17" between centers. Screw thread cutting range is 4 to 40 per inch right or left hand. Turning feeds as fine as .003" are provided for. Other bed lengths available are 3½', 4' and 4½' at slightly higher prices.

10 New Features **of the new 1936 model include: (1) Twin Gear Reverse for Right and Left Hand Threads and Automatic Carriage Feeds, (2) Ball Thrust Bearing on Headstock Spindle, (3) New Improved Tailstock and seven other important improvements.**

38 Practical Attachments, **many of them new, are furnished for the 1936 Model Workshop for milling, grinding, draw-in collet chuck work, and other manufacturing and machine shop jobs.**

Especially Recommended **for Manufacturing, Laboratory work, Auto Service shops, Electric shops and Home shops for fine, accurate precision jobs in metals of all kinds, woods, plastics and other machinable materials.**

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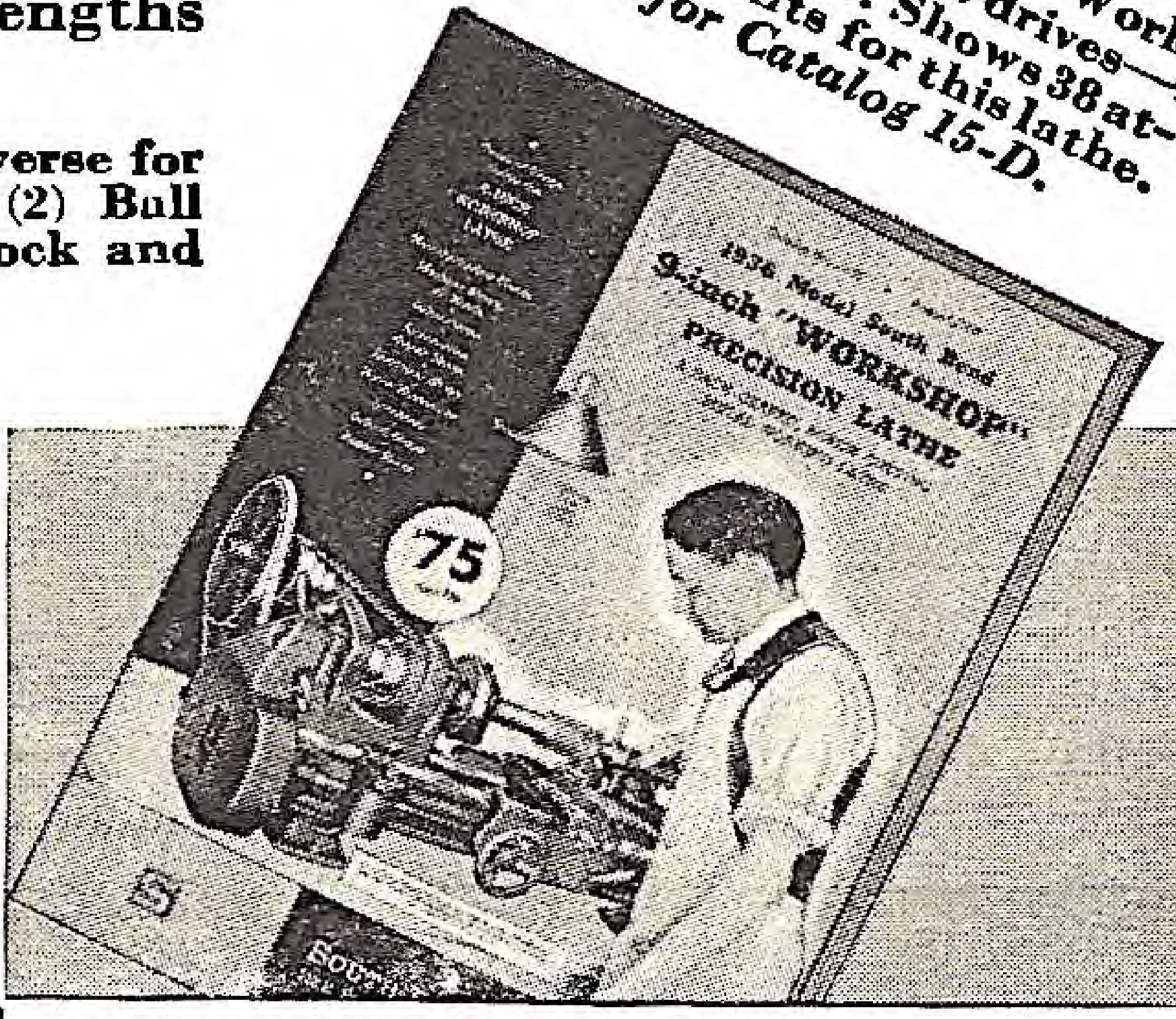

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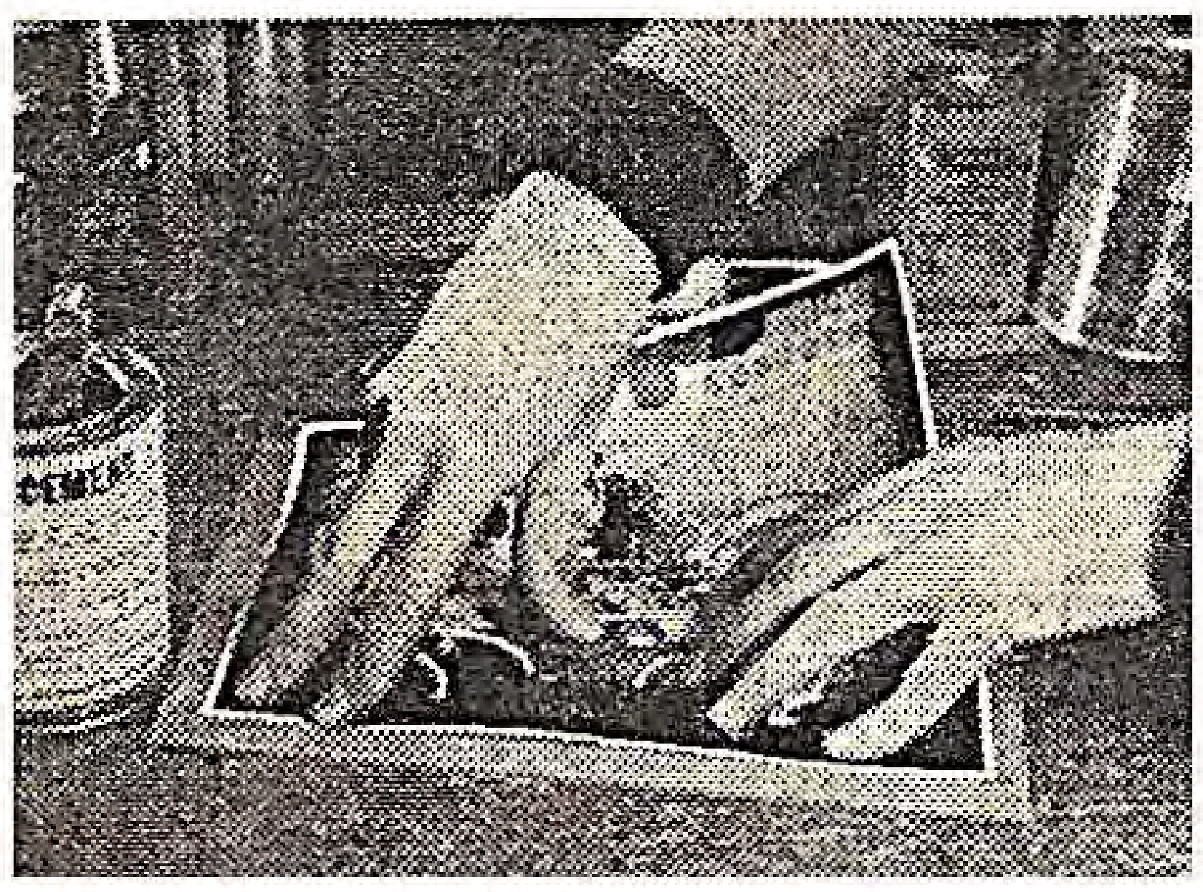
A new exponential horn has been scientifically designed for use with a special trumpet for both indoor and outdoor public address systems.

Electric generators are now available for gas powered washing machines in rural homes. Batteries for the radio set are charged while the washing is being done.

A can perforator slips over a can of liquid, punches two holes in the top, and furnishes a pour-spout and handle for convenient disposal of the contents.



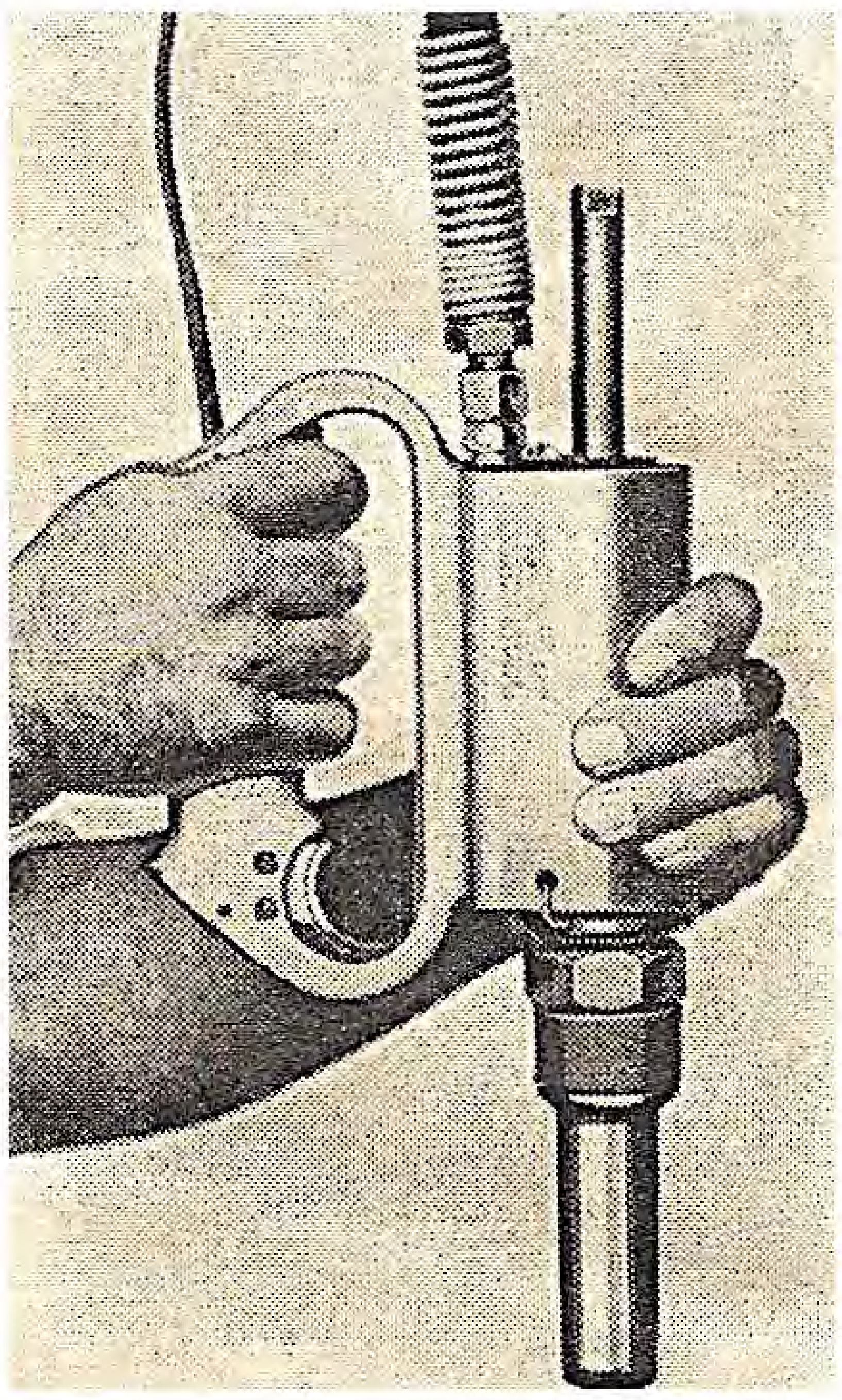
This cement, made of rubber latex and casein glue, is flexible, permanent, quick-acting and waterproof.

A night fishing float, consisting of a battery, bulb and switch, lights up the moment a fish takes the bait. Contact is made when float tips.

A paper humidity indicator, through a novel chemical printing process, can now be used as an advertising medium. It changes color according to air conditions.

A new type of safety transformer for inspection or maintenance service reduces potential shocking or explosive hazards.

Marine conversions of Ford models A, B, and V8. contain many improvements over the old conversions, including new type starters and water cooled exhaust and intake manifolds.



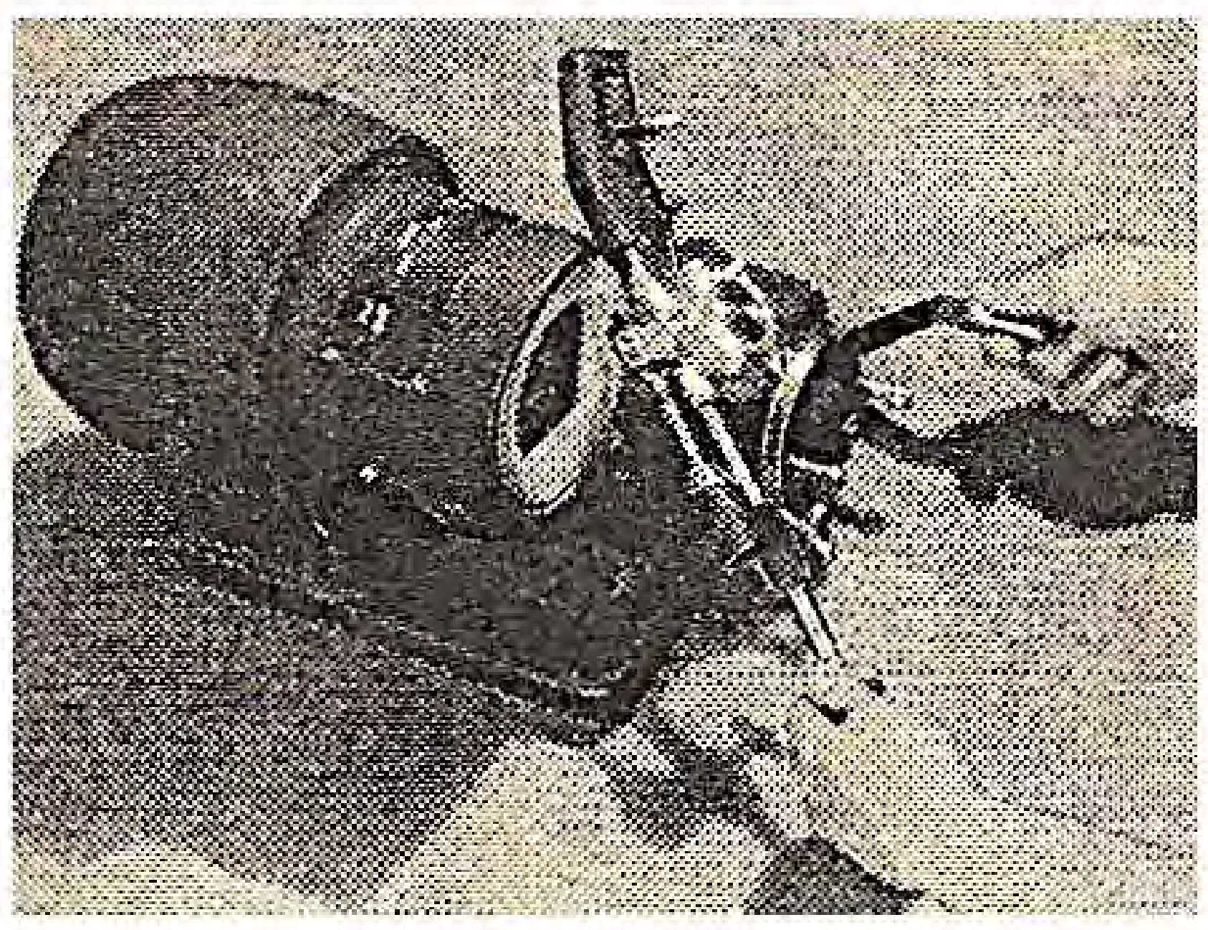
By use of this new riveting machine it is possible to both drive and back up rivets from only one side of work, a big improvement.

A newly invented fuse plug is automatically ejected when the fuse blows. A spring is released when the fuse burns.

A new tuning device for violins, and other stringed instruments simplifies tuning, adds resonance and enhances tone color.

A high efficiency boiler for oil burners contains a water jacketed combustion chamber and a large heat absorbing area, making for greater economy in fuel.

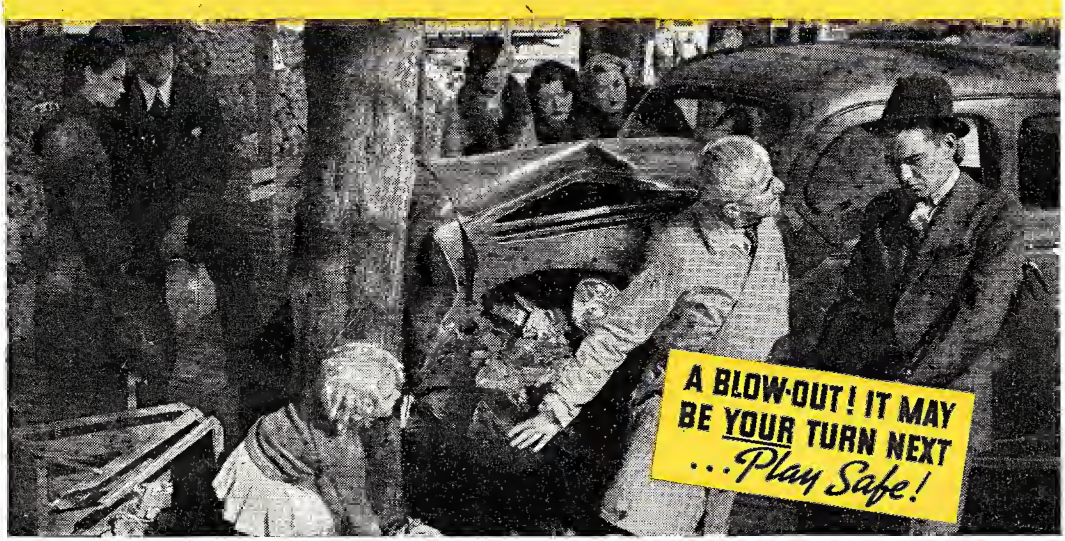
A new stapler for corrugated and fiber boxes seals the flaps without the use of glue. The stapler is small, easy to operate, and economical.



Large numbers of drills may be perfectly sharpened with this bench type drill grinder. It quickly restores broken points.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, self-addressed envelope to MODERN MECHANIX AND INVENTIONS, *Information Bureau, Fawcett Building, Greenwich, Connecticut Manufacturers are invited to submit material.*

DANGER AHEAD?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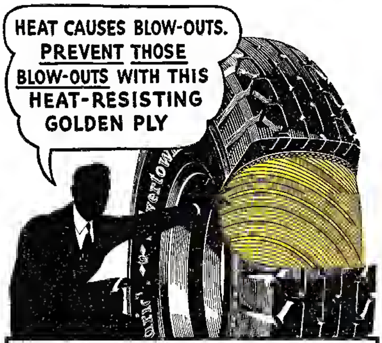
If you need tires now—if you are going to need them any time during the next few months—*don't take chances.* See your Goodrich dealer about a set of Golden Ply Silvertowns. *They cost not a penny more than other standard tires!*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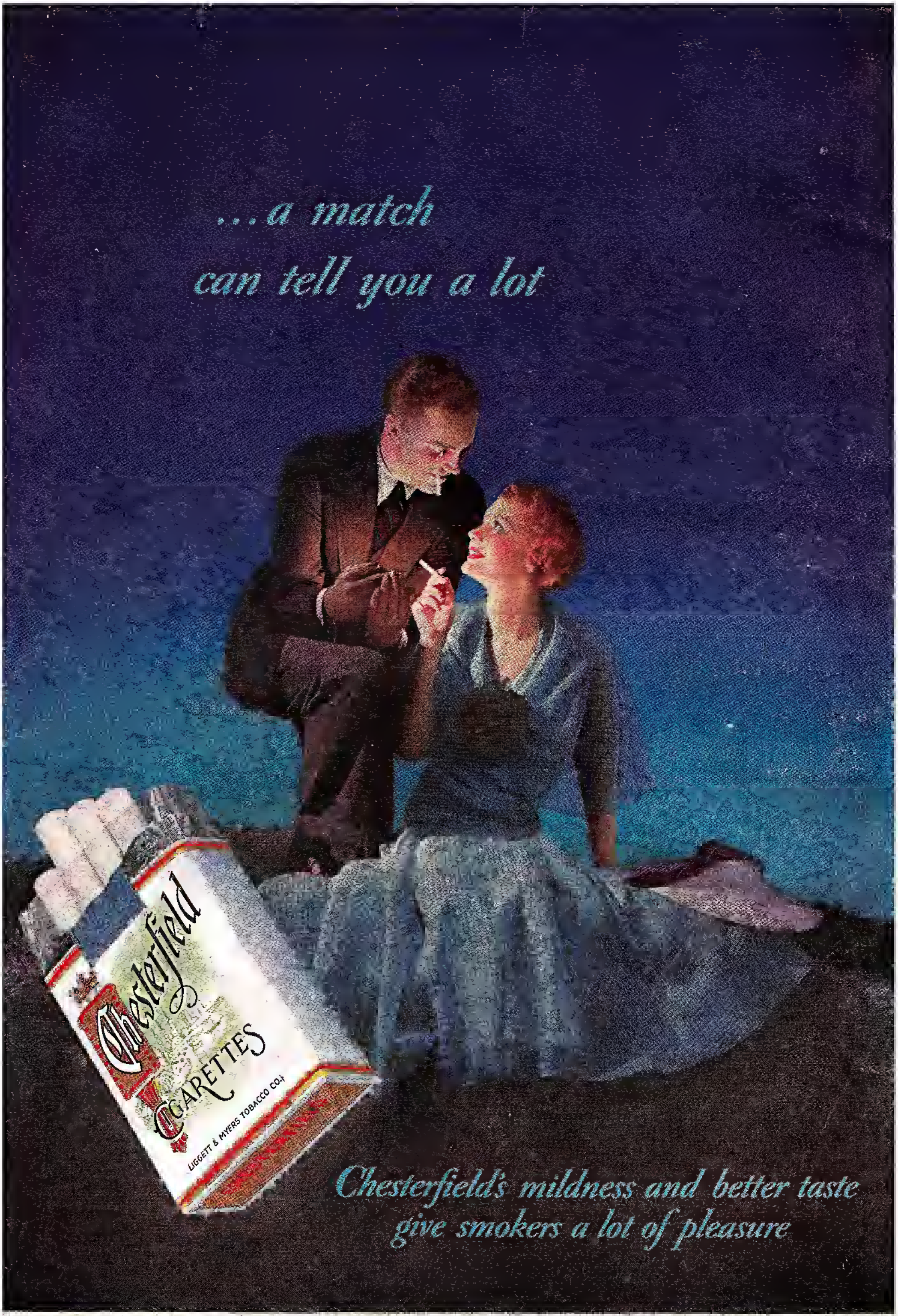
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A frank man to man talk about PATENTS-INVENTIONS -SELLING INVENTIONS

THE world of invention moves on. The Patent Office clerk who resigned his job back in 1833, because he said there was nothing left to invent, now stands out as one of the funniest men in American History. Think of everything that's happened in the last 100 years! Did you see the notice in the papers that an obscure worker, Hans Wach, has invented a simple device to utilize exhaust steam on steam boats? *Already, the report states, the steam ship lines have saved more than $15,000,000 in fuel bills with his invention.* Almost in the same breath the Dept. of Commerce announced that it will soon test out a new, non-crashable aeroplane, which the average man can learn to fly in a day, which will travel at 110 miles an hour and sell at the price of a cheap automobile. An unknown Seattle man has invented a robot to go 5,000 feet under the sea and recover millions and millions of dollars worth of gold lying at the bottom of the ocean since the days of the early Spaniards.

Remember this: For every outstanding big invention there are thousands of small, simple things for use in the home, the office, the factory, on the farm, on every sort of travel conveyance. Little articles like you find on the counters of a 10-cent store, hardware store, drug store, toy and novelty shop.

Many Little Ideas Have Big Commercial Possibilities

A person finds something he's using doesn't work right, or it's clumsy, or costs too much. He gets a happy thought. He improves the old Article. That's contribution to human progress. That's the way that many, many men have reached the goal of financial comfort, independence and even wealth. Most of the things millions of us use didn't come from the brains of engineers and physicists. They came from the mind and maybe the crude home work bench of Mr. Average Man, busily engaged in earning his bread and butter at whatever chance or circumstance has given him to do. The "little" man's opportunity as an inventor was never greater than it is today.

Who Are Inventors?

You'd be amazed at the men we contact in the course of a busy year. Most of them do not consider themselves inventors at all. During their work or leisure they get an idea. They work it out on paper. They get in touch with us about Protection. Did you know that a dentist invented the stock ticker, a school teacher the telephone, a farmer the typewriter, an artist the telegraph? Did you know that the crinkly hair pin—sold by millions now—came about because a husband saw his wife twisting the old-fashioned straight hair pin to make it stay in place? Poor men who have no thought of invention now will be financially well-fixed in a few years because of a happy thought that the world could use to advantage.

Can You Answer These Questions?

Ask yourself these questions: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the *first* man to think *of my invention*? Is a Patent worth the cost? Do I need a model? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been patented? These are but a few of the questions which usually confront the average man. You need the answers! YOU CAN HAVE THEM, without cost, trouble, or delay.

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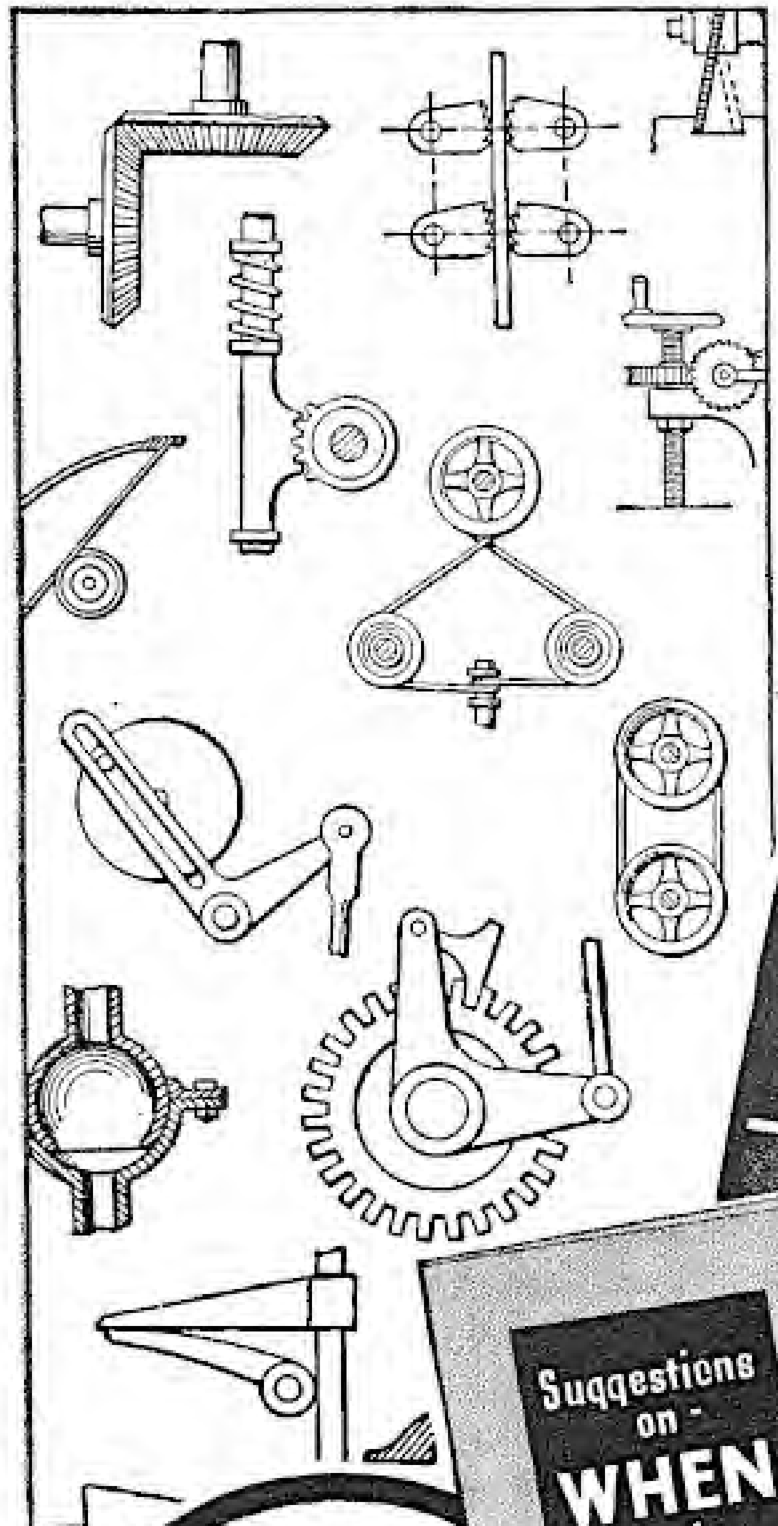

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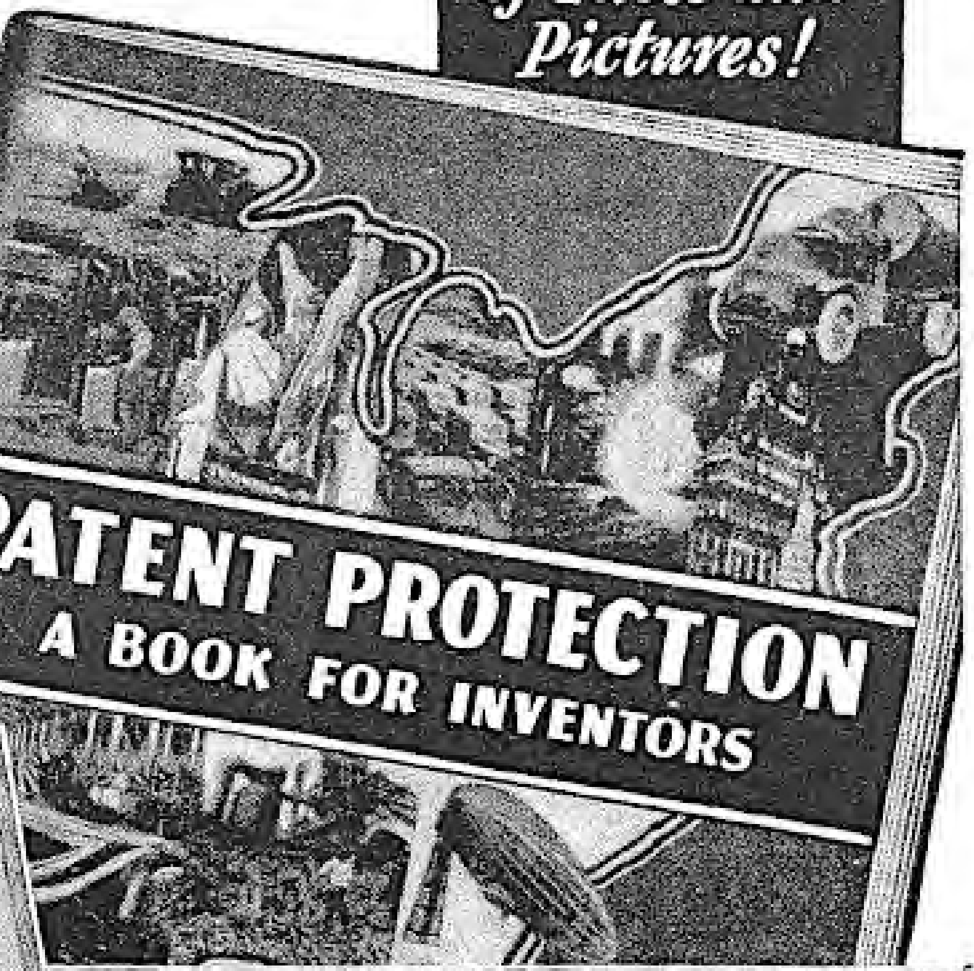

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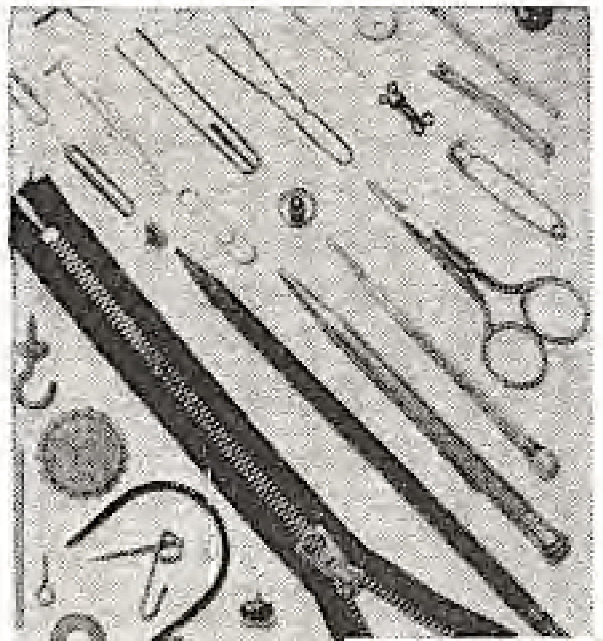

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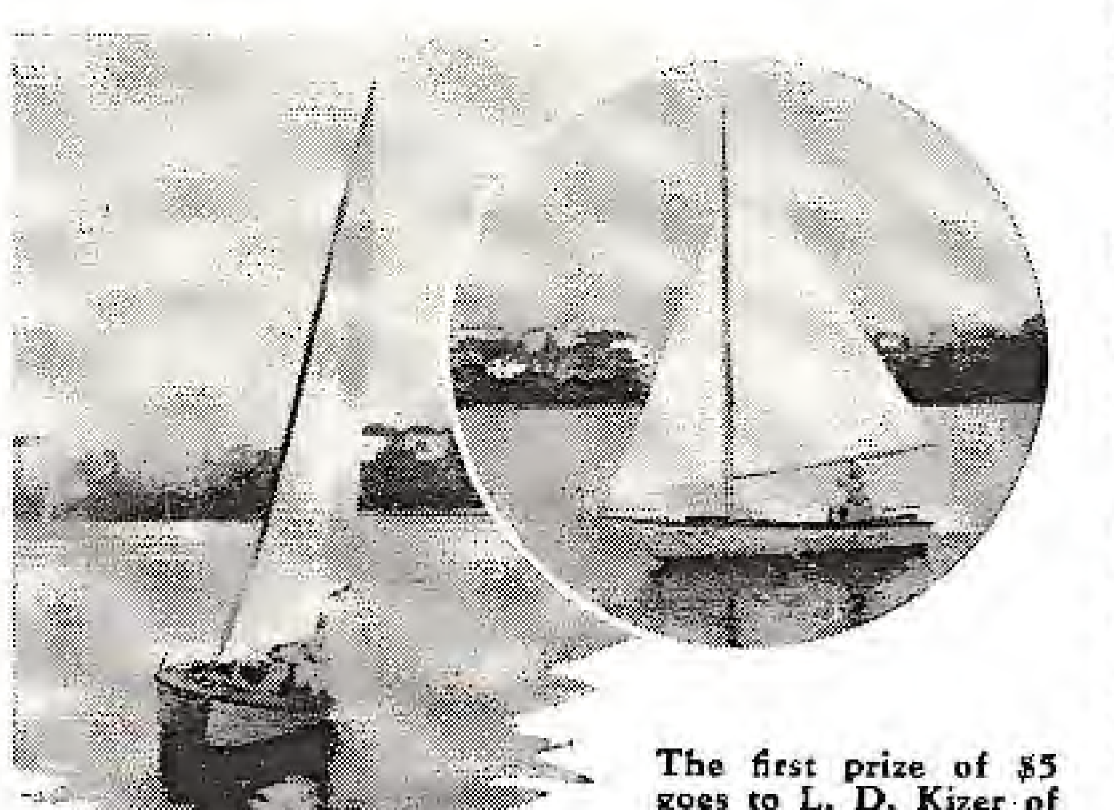
Random Chips from the Editor's Workbench



The first prize of $5 goes to L. D. Kizer of Oakland, Calif., for the novel kinks he used in building *Nomad*.

THIS issue brings you the last installment in MM's big $1,000.00 Automobile Identification contest and all of you who have not already done so should dig up the April and May issues and start identifying the cars so that your entries won't arrive too late. As we pointed out in an earlier issue, the prizes are big enough to outfit a brand new workshop with the latest equipment. You will find all the details on Page 46.

***

This is the time of the year when the spring fever bug gets into the old system and you would rather be out in the sun on some warm bank dreaming about the things you are going to build, as soon as you get the ambition. Don't let the bug get you down this year. Remember how you went all last summer without that boat you were going to build? And the garden furniture? And the countless other projects that could have made your summer more enjoyable? Turn to the How-To-Build features in this issue and start to work. If you want more projects, send for our free blue print booklets. Make this summer a profitable one.

***

As we predicted last month, this is going to be a season of boat building, and not because of the terrible floods which have been inundating the country either. There is something about a boat, no matter what kind, which makes everyone want to build one of his own. L. D. Kizer felt this urge when he ran across our plans for *Nomad*, one of the boats featured in our book, *How To Build 20 Boats*. He promptly set to work, and did such a good job that he won the first prize of $5 in our monthly Editor's Workbench Contest. Here is how he did it:

Oakland, Calif.

Dear Editor:

I am sending a photo of the boat I built from your plans of the "Nomad," and am very pleased with it. I made the cockpit larger and had to make some change in my sails for proper balance.

I now have an 18-inch bowsprit to carry my large, overlapping jib, which now measures 12' 6"x11'x6' 6". This change brings my center of effort back six feet, two inches from the stem. This point is just one foot, two inches ahead of the center of lateral resistance. The boat now balances beautifully and will point almost into the wind without any extra rudder.

Here's something new. Wishing to economize, I built the hull of miscellaneous lumber and covered it with galvanized sheet iron. Altogether the boat cost me but $20 not counting my labor in building her.

L. D. Kizer.

$750.00 Scrambled Photo Winner Writes of Experiences

Brooklyn, N. Y.

Dear Editor

This is to acknowledge the receipt of your check for $750. I can hardly express how thrilled I was to receive the first prize. It has been my habit in the past—need I say anything of the future—to read the pages of MM. I am an interior decorator, and MM gives me ideas. It was my good fortune to buy the magazine when the contest was announced. I decided to enter, and went into conference with my son.

"Listen, dad," he explained, "this contest requires skill, cleverness, and ability. Let me tell you the people who read this magazine are craftsmen. They can use their hands and their brains. And it's going to take a great deal of ingenuity to express their slogan in 10 words or less."

That word "Ingenuity", carelessly mentioned, furnished the key to our slogan—The Monthly Review Of Human Ingenuity.

I had given up all hope from the day I sent my "Hall of Fame" away. This was my first real contest, and I thought the publisher's nephew or some other relation would get first prize. At least that was what people always told me about contests.

It wasn't until the last week of the contest that I had time to work on my idea. I didn't see how I could finish it in a week. I still don't understand how I did it. I managed to have the building completed by six o'clock on the evening of Jan. 3, and entries had to be postmarked by that date.

Here was a nerve wracking situation. We had to build a crate, get a truck, and deliver the box at the express office before 8 p.m. when the office closed. By dint of hard work, and the wildest ride I ever took in my life, we arrived at the office at 7:58 p.m., with just two minutes to spare.

As we look back at it now, it was a grand adventure. We had a lot of fun, and it paid cash dividends. We spent exactly $7.50, and got back a dollar for every penny.

Gerald Damush.

***

That letter should answer a lot of questions concerning alterations in sail plans. It can be done, provided you are as careful as Mr. Kizer was in figuring out his centers of effort and lateral resistance before making the changes. These centers of effort and lateral resistance have been the bogey men of many boat builders, but they are carefully explained in our book, *How To Build 20 Boats.*

***

"The Olympic Monotype I built from your plans won the cup offered by the King Yacht Club, Toledo, Ohio, last summer. It won the highest number of points in a series of 20 races. The second place was also won by an Olympic built from your blueprints," writes E. P. Schweitzer of Toledo.

***

Getting away from boats for a moment, but still sticking close to the water, we award our second prize of $3 in our work bench contest to Robert Forstian for his diving helmet. He writes:

Durhan, N. C.

Dear Editor:

I am enclosing a picture of a diving helmet I made from plans published in one of your earlier magazines. This picture was taken before the phones were installed. It was very successful. I would like to hear from some of the other boys interested in diving.

Robert Forstian.

"Sincere Thanks for $300.00" Writes Second Prize Winner

Marshalltown, Iowa.

Dear Editor:

Will you kindly accept the sincere thanks of my wife and myself for your check for $300.00—the second prize in your recent Scrambled Photos contest?

First and foremost a good share of it will go into the home we are buying. Then I am going to add a few much desired pieces to my workshop. A nine-year-old son is sometimes hard on saws, planes, etc., and so some of them must be replaced. We hope, too, to put a bit of the money away toward the boy's future education.

Your magazine is a splendid aid to us amateur carpenters and I hope you will continue to give us more of your excellent contests.

George A. Beecher.

Irvin Streng, our third prize winner this month, is shown inspecting his completed model of "Tiny Tom," MM's pencil length locomotive. He became so interested in his model that he bought a lathe to rush the job.

***

The great floating palace, the Queen Mary, is now receiving her final check-up preparatory to sailing for the United States in June. The beautiful lines of this superboat are proving a model builder's delight. You can build a mantel-size Queen Mary from MM blue prints made to actual size of model. The prints sell for 75 cents.

"I would like to hear from other boys interested in diving," writes Robert Forstian, who wins second prize of $3 in this month's Workbench Contest.

***

Builders of *Tiny Tom*, our pencil length model locomotive will find some helpful construction hints in this third prize winning letter from Irvin Streng of Chicago, Ill. He became so engrossed in the model he finally bought a lathe to rush the work. His letter follows—

Chicago, Ill.

Dear Editor:

I have just completed a model of "Tiny Tom" from the plans published in MODERN MECHANIX & INVENTIONS

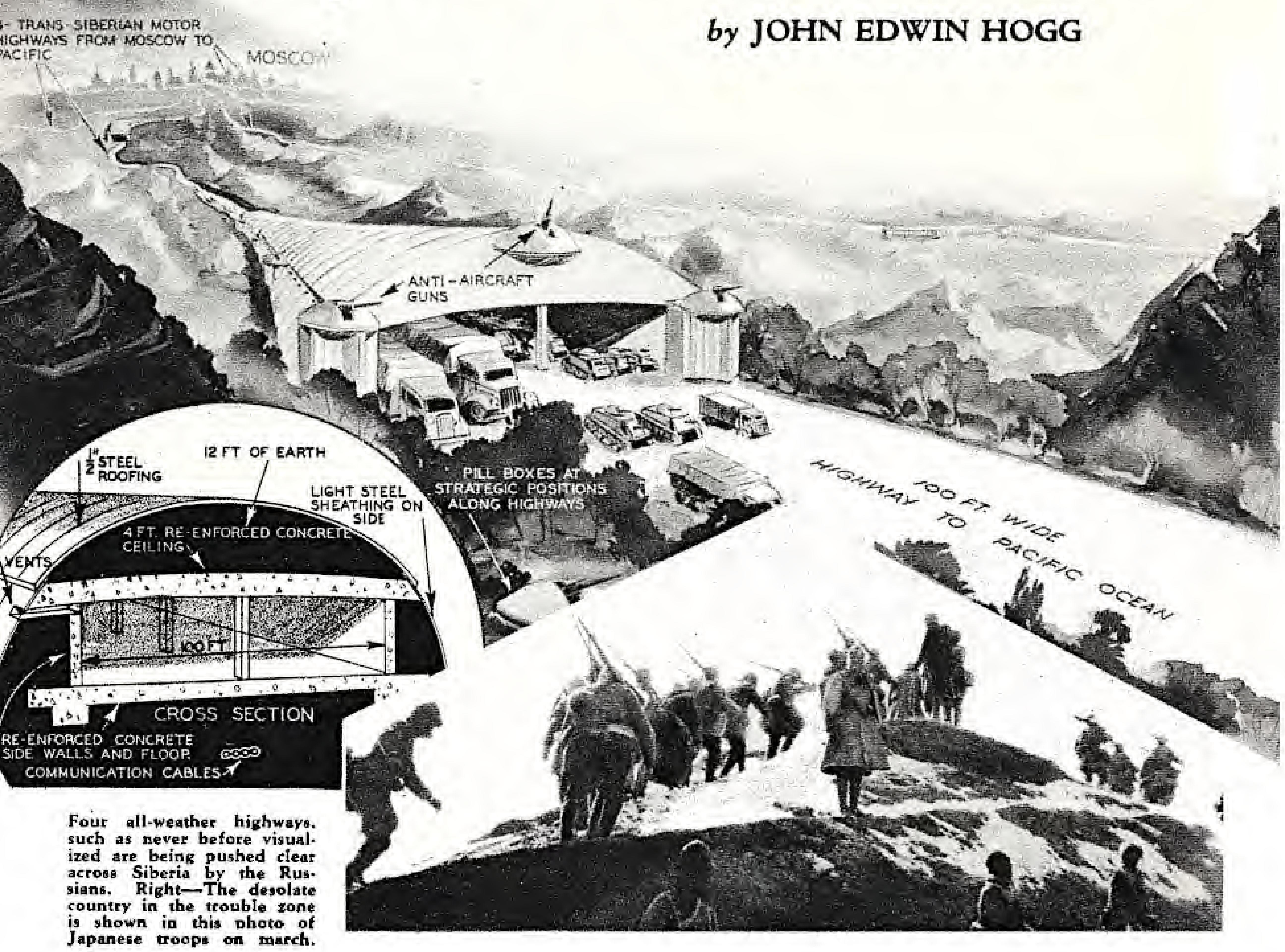
[*Continued on page* 25]

Here is a close-up of Streng's "Tiny Tom." The drive wheels were made up of brass sheets soldered together and turned out on lathe. All parts were made at home except the motor.

ASIA, the TINDER BOX of WAR

by JOHN EDWIN HOGG

Up behind the black clouds over Mongolia wait the Four Horsemen, soothing their champing steeds. For soon may come the age-old cry. Then War, Pestilence, Famine and Death will ride the poverty-stricken old world again.


TRANS-SIBERIAN MOTOR HIGHWAYS FROM MOSCOW TO PACIFIC
MOSCOW
ANTI-AIRCRAFT GUNS
1½" STEEL ROOFING
12 FT OF EARTH
LIGHT STEEL SHEATHING ON SIDE
PILL BOXES AT STRATEGIC POSITIONS ALONG HIGHWAYS
4 FT. RE-ENFORCED CONCRETE CEILING
VENTS
100 FT
CROSS SECTION
RE-ENFORCED CONCRETE SIDE WALLS AND FLOOR
COMMUNICATION CABLES
HIGHWAY 100 FT. WIDE TO PACIFIC OCEAN

Four all-weather highways, such as never before visualized are being pushed clear across Siberia by the Russians. Right—The desolate country in the trouble zone is shown in this photo of Japanese troops on march.

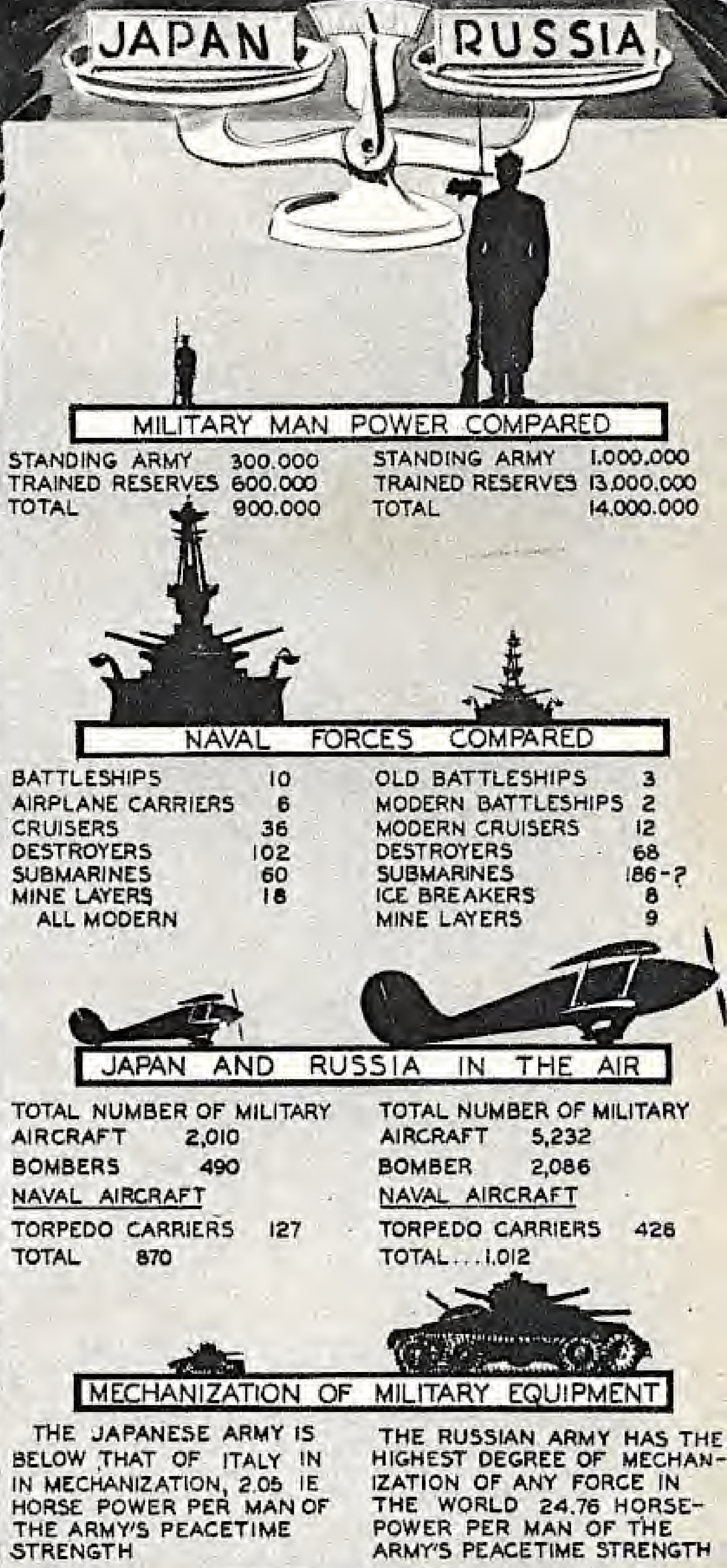
WITH war clouds hanging ominously over Africa and the whole of Europe, a far more serious threat to world peace is rapidly approaching a climax in the Far East. Here the interests of Japan and Russia have fallen into a conflict apparently impossible of settlement short of a military clash. Steadily and irresistibly Japanese and Russian forces are converging upon Mongolia, No-Man's Land of Asia.

While Europe frantically prepares for war along every land frontier, at sea and in the air, events of world-wide significance have pointed toward war between Russia and Japan for the past four years. We don't hear much about it because vast distances, poor communications and the military censorships of Tokyo, Nanking, Hsinking and Moscow have been fairly successful in keeping these happenings from the ears and eyes of the world. Nevertheless, qualified observers feel that it is only a question of time before the shots of recent "border incidents" along the Siberian frontier may set off an explosion that will shake the earth.

Japan has definitely announced her intention of expanding into the Asiatic mainland. In Tokyo it is no longer a military secret that she intends to drive Russia from the Pacific. Russia, on the other hand, is determined to hold what she has and will not be driven except by superior military force. In the Russian Sea of Okhotsk, one of the richest fishing grounds on the face of the earth, the interests of the two nations are ensnarled over the fishery rights. Japan's occupation of Manchukuo and her more recent thrusts toward Siberia through Mongolia is a deadly threat to Russia. Both nations are facing grim realties. Both will fight to the finish before they will brook obstruction of their national destinies.

Hostilities are scheduled to begin in Outer Mongolia. Japan by clinching her hold upon Manchukuo has checkmated the threat of a Soviet thrust southward from Siberia's maritime province. By strategically gaining control of the Chinese Eastern Railway she has shifted her first line of defense a thousand miles inland from the Sea of Japan. The Trans-Siberian Railway from Manchuli clear around the northern frontier of Manchukuo to its Pacific terminus at Vladivostok now lies literally under the bayonets of the Japanese army. This move on the part of Japan proves she contemplates winning a modern Russo-Japanese War by the identical trick that defeated the Tsar in 1905—by slicing lines of transportation and communication to leave the Russians hog-tied with the problem of moving troops and equipment across 4,000 miles of Siberian wilderness.

The Russians, however, are not asleep. Realizing that disruption of their only completed rail line to Vladivostok would leave their military efforts mastheaded far in the interior of Siberia, they have taken effective steps to prevent such a thing from happening. They are double-tracking the Trans-Siberian Railway throughout its length. Simultaneously, they are rushing the construction of a new, alternate, double-track line to the Pacific from Nizhniiudinsk around the



MILITARY MAN POWER COMPARED

JAPAN		RUSSIA	
STANDING ARMY	300.000	STANDING ARMY	1.000.000
TRAINED RESERVES	600.000	TRAINED RESERVES	13.000.000
TOTAL	900.000	TOTAL	14.000.000

NAVAL FORCES COMPARED

JAPAN		RUSSIA	
BATTLESHIPS	10	OLD BATTLESHIPS	3
AIRPLANE CARRIERS	6	MODERN BATTLESHIPS	2
CRUISERS	36	MODERN CRUISERS	12
DESTROYERS	102	DESTROYERS	68
SUBMARINES	60	SUBMARINES	186-?
MINE LAYERS	18	ICE BREAKERS	8
ALL MODERN		MINE LAYERS	9

JAPAN AND RUSSIA IN THE AIR

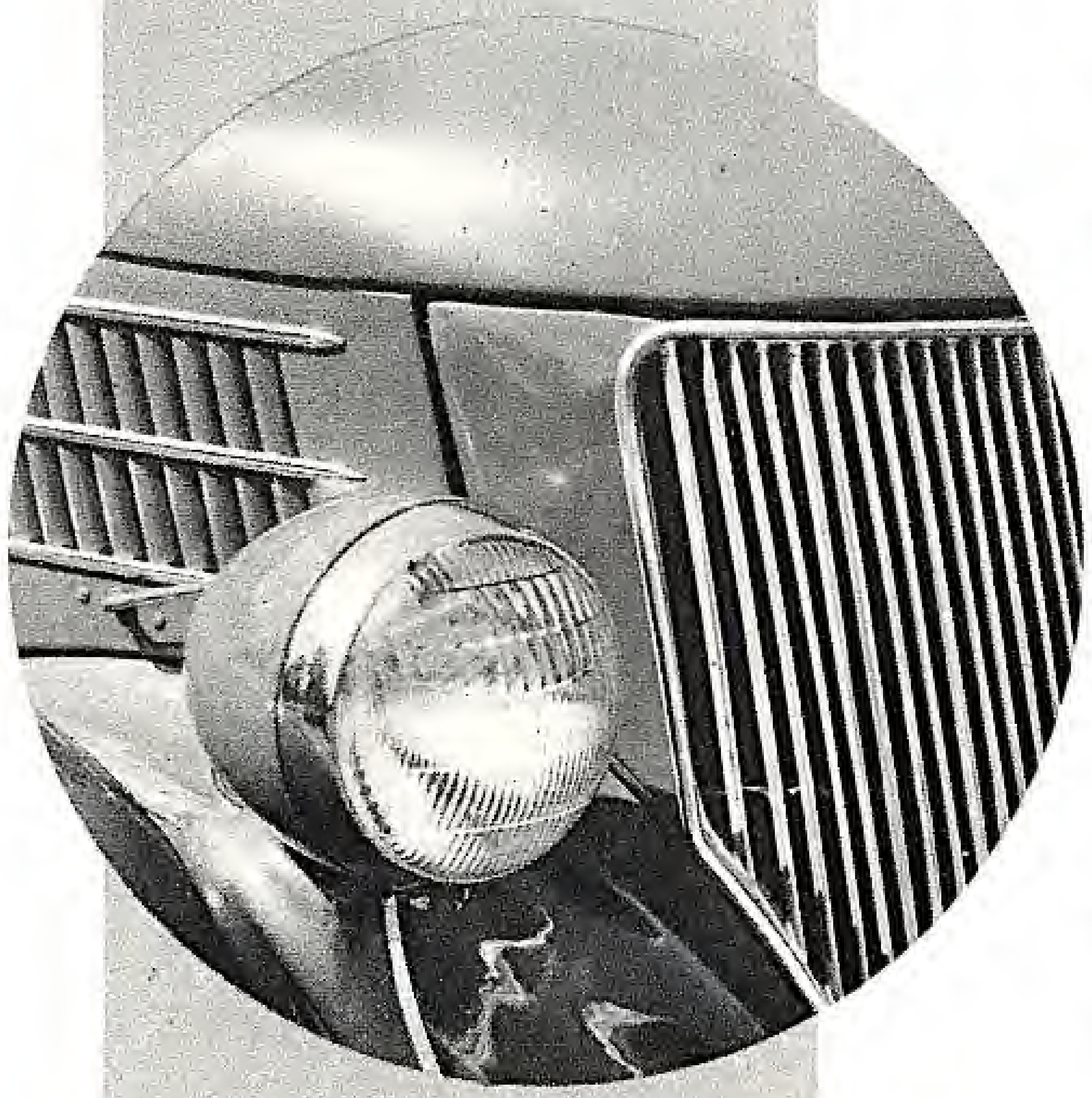
JAPAN		RUSSIA	
TOTAL NUMBER OF MILITARY AIRCRAFT	2,010	TOTAL NUMBER OF MILITARY AIRCRAFT	5,232
BOMBERS	490	BOMBER	2,086
NAVAL AIRCRAFT		NAVAL AIRCRAFT	
TORPEDO CARRIERS	127	TORPEDO CARRIERS	426
TOTAL	870	TOTAL...	1.012

MECHANIZATION OF MILITARY EQUIPMENT

JAPAN	RUSSIA
THE JAPANESE ARMY IS BELOW THAT OF ITALY IN IN MECHANIZATION, 2.05 IE HORSE POWER PER MAN OF THE ARMY'S PEACETIME STRENGTH	THE RUSSIAN ARMY HAS THE HIGHEST DEGREE OF MECHANIZATION OF ANY FORCE IN THE WORLD 24.76 HORSE-POWER PER MAN OF THE ARMY'S PEACETIME STRENGTH

Russia has perfected tank mechanism to the nth degree. There are 100-mile-an-hour tanks, amphibious tanks, midget tanks which climb with all the agility of mountain goats, steel moles that dig themselves in to become one-man fortresses, all armed with light cannon and heavy calibre machine guns.

IDENTIFY CARS—WIN IN $1,000.00 Cash Contest



THE NAME OF THIS CAR IS

Ford

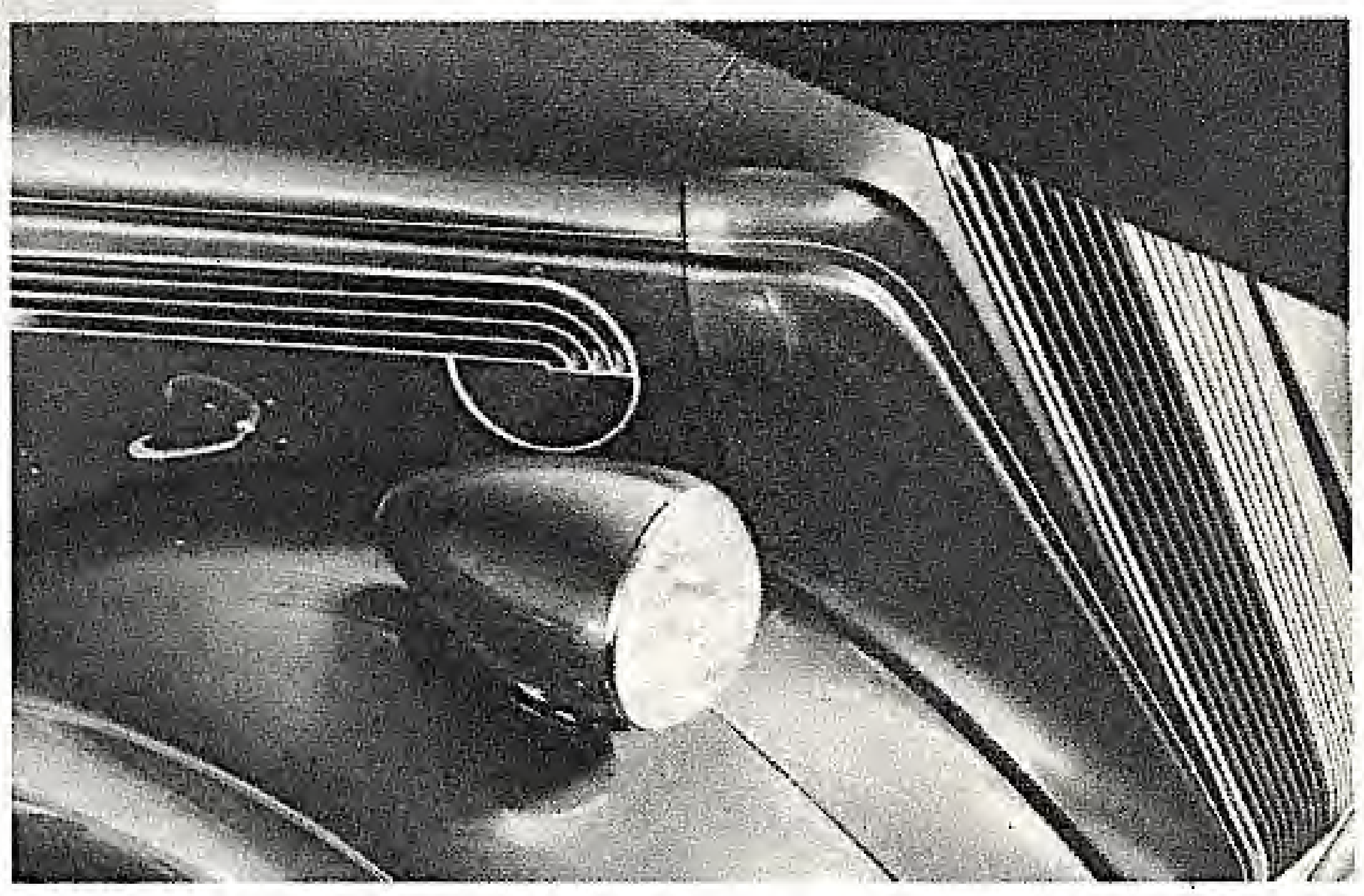
Your last chance to win!

THE four photos on these pages complete the series of 12 in this unique $1,000.00 contest with its 183 cash prizes.

No time is to be wasted if you are to get your entry in to the Automobile Contest Editor by June 1. In the April and May issues of this magazine you will find the preceding eight photographs in the contest. Possibly you have them already indentified. If not, lose no time.

The next step is to write in ten words or less a "Safety Slogan" on some phase of motoring safety. This is highly important as the slogan will be one of the points considered by the judges.

All 12 pictures must be included before the entry is eligible for a prize. After identifying the car from its distinguishing features shown in the photograph, simply write its name in the designated space, clip out the photo and paste it down upon a sheet of paper. Every one has a chance to win.



THE NAME OF THIS CAR IS

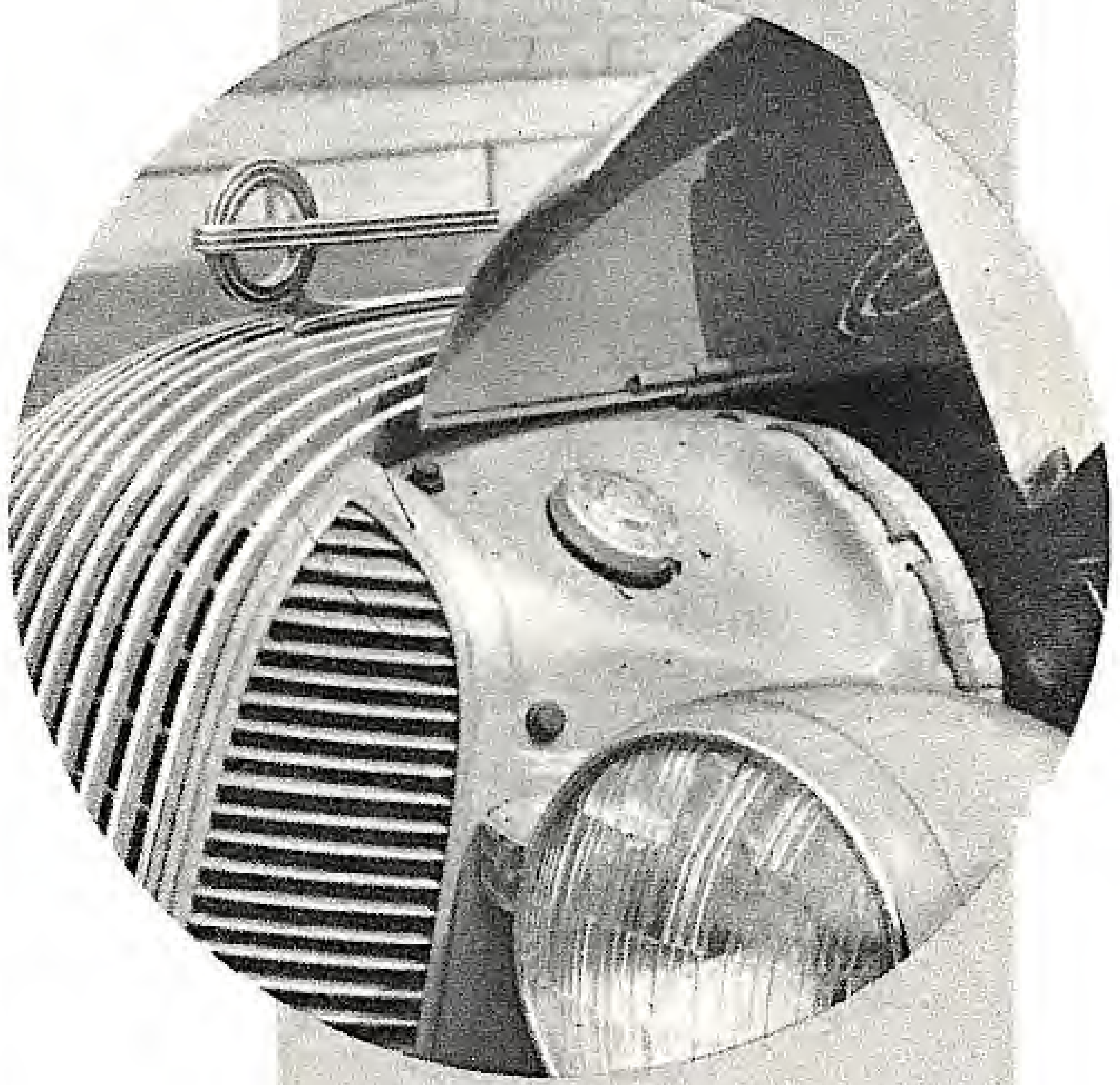
THE QUESTIONS

ANSWER THESE QUESTIONS

1. What is your age and occupation? ....
2. Do you own an automobile? ....
   What make? ....
   What year? ....
3. Do you plan to buy a new car? .... When? ....
   What make? ....
4. Approximately how many miles do you travel in your car annually? ....
5. What brand gasoline do you regularly buy? ....
   What oil? ....
   What tires? ....

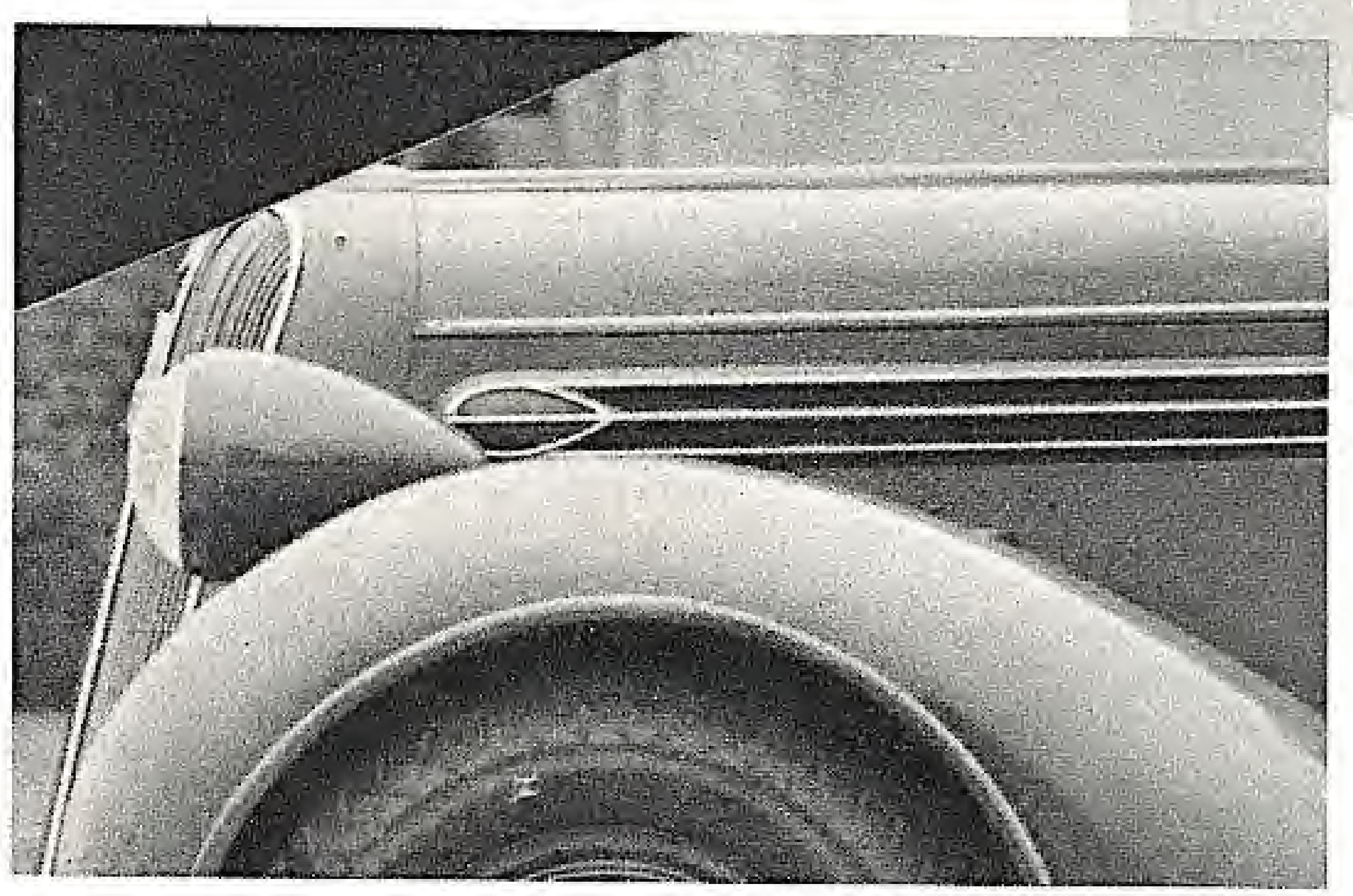
THE RULES

1. Cut out each photograph and in the space below it write the name of the car from which the identifying feature was taken.
2. Answer accompanying questions. Your replies to these questions will not be considered by the judges, but to be eligible each entrant MUST answer the questions.
3. In ten words or less state your "SAFETY SLOGAN." The originality shown in the "SAFETY SLOGAN" WILL BE CONSIDERED by the judges. The "Safety Slogans" are to become the sole property of Modern Mechanix Publishing Co.
4. This contest is open to everyone except employes of Modern Mechanix Publishing Co.
5. You don't have to buy a copy of this magazine or be a subscriber to enter this contest. Recognizable facsimiles of the photographs will be acceptable.
6. Contestants need not submit elaborate entries. Neatness, brevity, and accuracy will be the deciding factors. All 12 photographs must be entered. No entries will be returned.
7. The editors of this magazine will be the judges. Their decisions are final. In case of ties duplicate prizes will be awarded.
8. Mail your entry to the AUTOMOBILE CONTEST EDITOR, Modern Mechanix Publishing Company, Greenwich, Conn. Write your name and address clearly on your entry. To be eligible entries must be postmarked on or before June 1, 1936. Winners will be announced as soon as possible after the close of the contest.



THE NAME OF THIS CAR IS

Pontiac



THE NAME OF THIS CAR IS

THE PRIZES

First Prize—	$250.00 IN CASH
Second Prize—	150.00 IN CASH
Third Prize—	100.00 IN CASH
5 Fourth Prizes—	25.00 EACH
10 Fifth Prizes—	10.00 EACH
15 Sixth Prizes—	5.00 EACH
50 Seventh Prizes—	2.00 EACH
100 Eighth Prizes—	1.00 EACH
	$1,000.00
TOTAL—183 PRIZES	IN CASH

The KENTUCKY DERBY Testing Laboratory *of Super-Horses*

By COL. MATT J. WINN

(President American Turf Association)

As Told To Ollie M. James

Catapulting around the first Churchill Downs turn. It takes brains and brawn to swirl a hurtling horse into a sudden gap. Right here is where the Derby is won or lost by the jockey.

Grandest Kentucky Colonel of them all—Col. Matt J. Winn. From a tree in the Churchill Downs infield, he saw the first Derby run in 1875. Then, 27 years later, he became the big boss, and set himself to make the Kentucky Derby internationally famous. This earned him the title of "Father of the Kentucky Derby." Col. Winn is president of the American Turf Association.

WHAT event, lasting only two minutes and a few seconds, could attract 3,000,000 spectators over a period of 62 years, build up a $3,000,000 plant and offer a chief incentive to a half-billion dollar industry?

There's only one—the Kentucky Derby. It is the pathway to the hall of fame for horses, jockeys, trainers and owners, and the final testing laboratory for all great thoroughbreds.

What does it take to win the Derby?

Class!—a champion horse, and a jockey worthy of his mount.

You don't start with the horse. You start with his ancestry. The blood lines of thoroughbreds are as carefully recorded as the lineage of a royal family.

But the chemistry of horseflesh has no fixed rules. The offsprings of champions may fail to inherit the speed, stamina and courage of their sires and dams. A breeder cannot tell until the young horses enter the acid test of racing.

When the renowned Man O' War raced against John P. Grier, another great horse of his day, they matched stride for stride for some distance. Then Man O' War drew ahead and won in an indomitable demonstration of class. John P. Grier never again displayed the same greatness he had shown before meeting Man O' War. The defeat took something out of him. Horsemen call it "being looked in the eye."

Jockeys play an important part in the way horses run, and here again psychology is a potent factor. Experience has shown that horses will run better for some jockeys than for others, although outwardly there may be no difference in the skill of the riders. An outstanding jockey has an emotional kinship with his mount.

The good jockey knows his horse, knows the pace he likes best, how much energy he can expend and have enough left for the stretch.

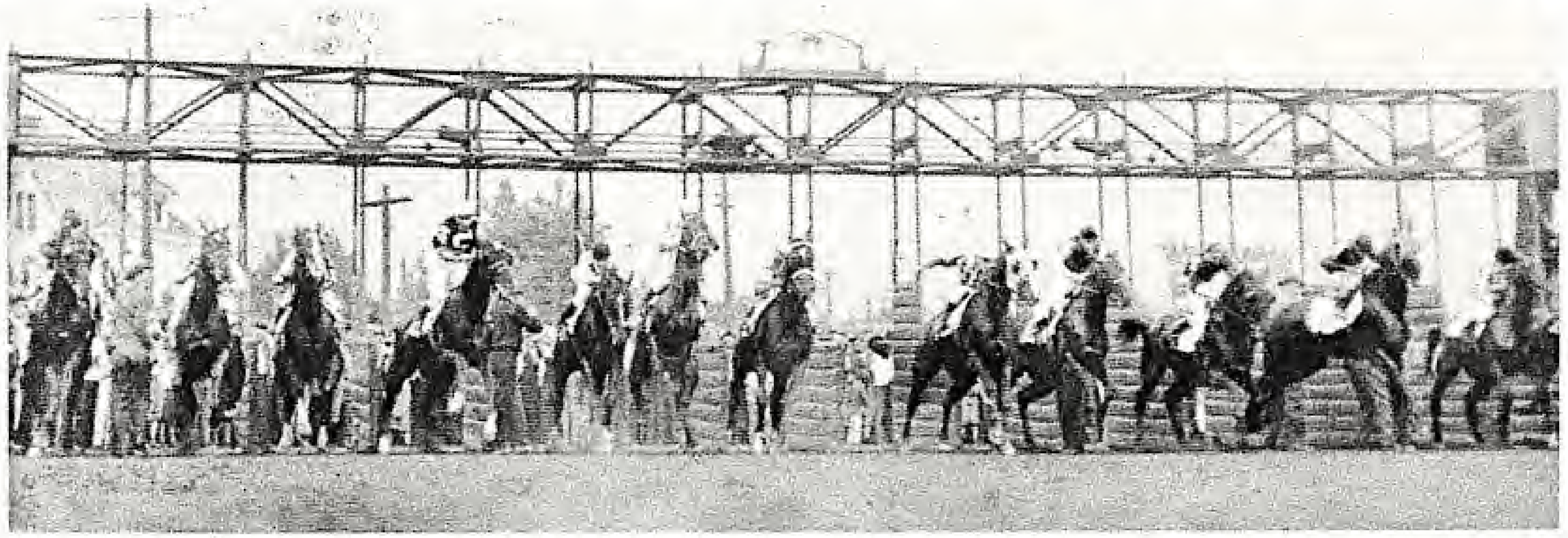
It's the jockey's job to handle his horse like a racing driver handles his car, making use of speed where speed is needed, and conserving time and ground. But the jockey rides a high-strung animal of almost human temperament, not an enduring metal machine. He must have a good "seat," poised on the horse's withers, or shoulders, balanced in tune with the horse's stride. He must have a "clock in his head," to tick off the flying seconds against the rataplan of hoofs.

Every foot of ground in a race is important, but the start is especially so. When the tape flies up and the bell rings, there's always a scramble for the position next to the rail.

The horse away in front, on the rail, has the advantage. To pass him, the other horses must run around. That isn't much of a handicap on the straight stretches, but on the curves—and half a race may be around the

[*Continued on page* 132]

With the rising sun come stop watches and the Derby Hope to breeze through stiff workouts. Note how the jockey literally "perches" in the short stirrups.



A million dollars in horseflesh is led into the starting gate and, after an age-long wait in which fractious thoroughbreds are quieted, comes the starter's bell and the excited roar of thousands of spectators—They're Off! In the scramble for rail position anything can happen, and does. The dreams and fortunes of a lifetime are tied up in the ace of thrills pictured above.

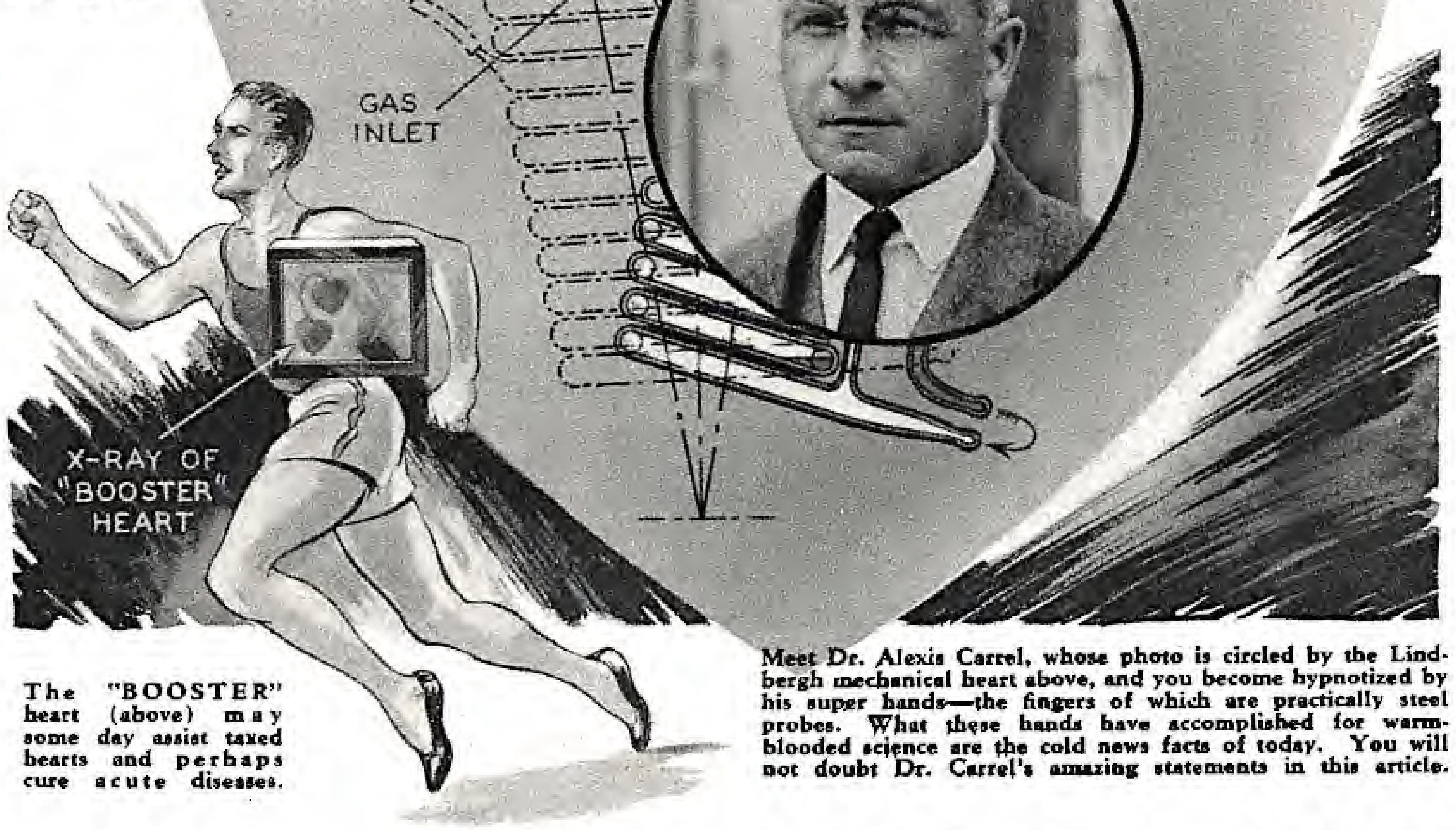
CAN SCIENCE MAKE US LIVE FOREVER?

by DONALD GRAY

Out of legend came Frankenstein into Universal Pictures with vivid realism. What real life miracles will future scientists wrought?

Above is a science achievement that permits doctors to measure life expectancy through the super-eye camera. Thus eye vein changes will prescribe treatment to prevent ruptures and fatal blood vessel breaks.

Look down into the Well of Youth through these pages and see Biology's most recent and amazing discoveries. For "booster" hearts and human cold storage are just two of many longevity miracles the doctor orders for your descendants.



The "BOOSTER" heart (above) may some day assist taxed hearts and perhaps cure acute diseases.

Meet Dr. Alexis Carrel, whose photo is circled by the Lindbergh mechanical heart above, and you become hypnotized by his super hands—the fingers of which are practically steel probes. What these hands have accomplished for warm-blooded science are the cold news facts of today. You will not doubt Dr. Carrel's amazing statements in this article.

YOUR great-great-great-great-great grandchildren may live for a thousand years!

Let us assume that it is the year 2136 and this far-off descendant of yours has reached the age of twenty-five. He summons a scientist and says:

"I have decided to retire from the world for a while. Put me in a storage vault and leave orders that I be restored to the world of living men one hundred years from today."

The scientist obeys matter-of-factly; such orders are mere routine. By medical means the subject is placed in a state of suspended animation or latent life, and stored away in a chamber with hundreds of other men and women who are neither alive nor dead. Their bodies neither grow nor age nor decay.

When 2236 rolls around, the subject is awakened easily, and although a century has passed, he is still a vigorous young man of twenty-five, ready to spend the rest of his years as he chooses or to return occasionally to his Rip Van Winkle sleep if he so desires.

Fantastic? Extremely so. Yet entirely with in the range of scientific possibility!

The suggestion does not come from a wild-eyed visionary, but from no less a world-famed authority than Dr. Alexis Carrel of the Rockefeller Institute for Medical Research.

Dr. Carrel is famous for some astounding biological experiments. He has, for instance, kept a strain of cells from a chicken's heart alive and thriving in a glass container for twenty years. Recently, with Col. Charles A. Lindbergh, he has developed the Lindbergh "life chamber" which is a robot heart of glass in which extirpated organs live and behave very much as they do in the body.

So when Dr. Carrel predicts that in remote centuries human life may be immeasurably extended, the statement comes from the one man in the world who is best qualified to make it.

There are several possible means of extending the life span which Dr. Carrel sees open to science. Rejuvenation, or the surgical grafting of young glands into an aging individual, we have only begun to understand. In ages to come such operations may be commonplace, and a fifty-year-old man, spending a day or two in a hospital, may emerge with his age-calendar set back thirty years.

It is quite possible, too, Dr. Carrel believes, that men and women may be enabled to

Uncle Sam BATTLES "DUSTERS" and FLOODS

by JAMES DYSON

RADIO warnings, people evacuated to hills, city streets swirling torrents, houses tumbling down murky rivers, hunger, thirst, almost pestilence—that was the spring just past.

First flood, now dust—a billion tons of priceless top soil afloat over the ailing earth.

It is difficult to think of anything wetter than a flood, hard to imagine anything dryer than a dust storm, yet basically they are the same—Nature's way of venting her fury on man for upsetting her delicate balance.

Ol' Man River brings the flood down. We dam him, sand-bag him, stone his banks and bed, but always at the point of effect, seldom at the cause. But we can't even do that much when dust clouds storm the land. We can only choke, gasp for breath, and ponder the reason for it all.

The reason?

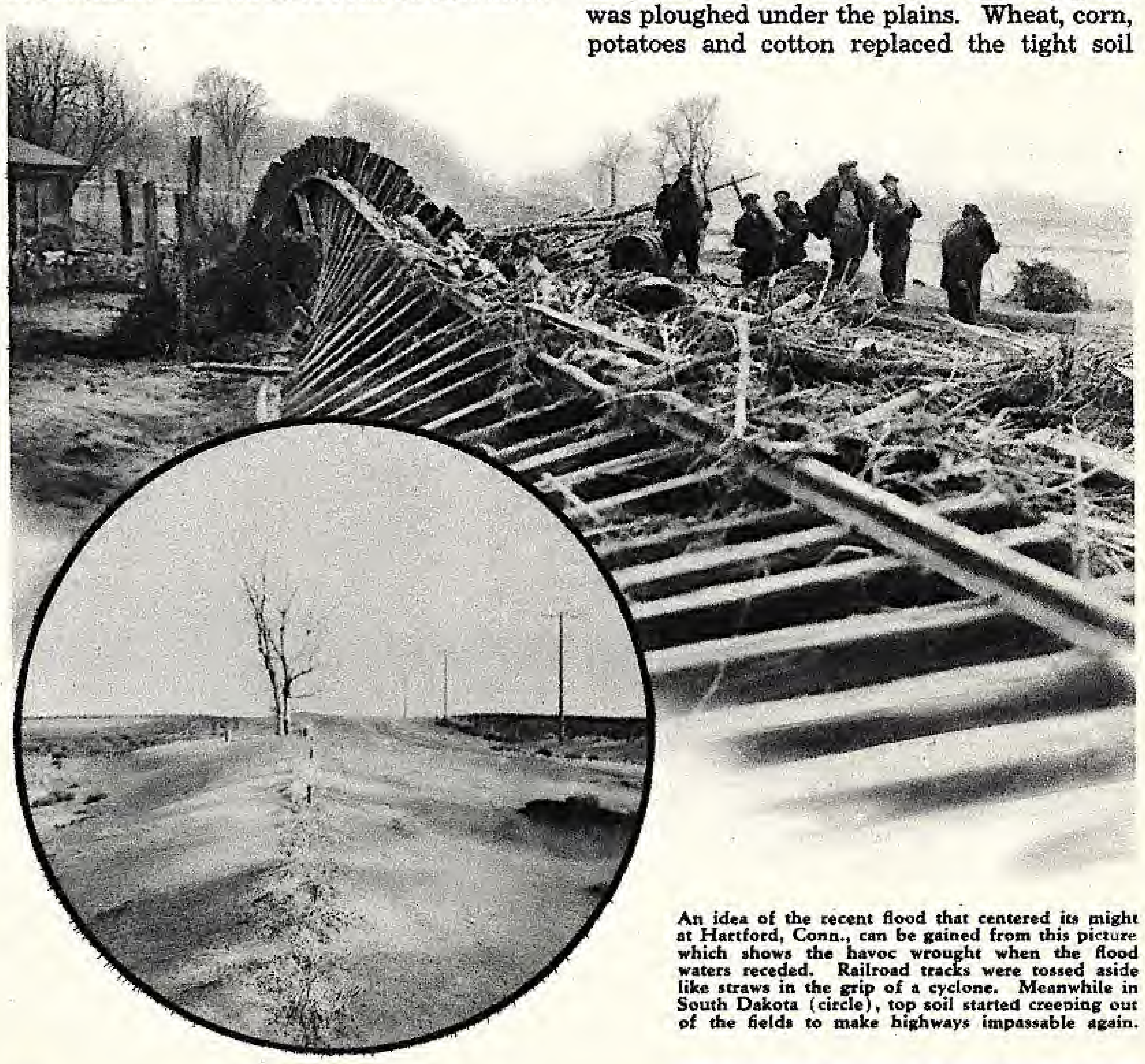
Nature gave a glorious land to the Indians, a land carpeted with vegetation, with undergrowth, the great trees of the forest, and the grassy plains for which these first Americans so vainly fought. The wind blew as hard then as now, and when rivers infrequently spread out of their courses, they did so slowly and with no violence.

Then came the white man—and civilization with covered wagons which rumbled further and further west. Forests were chopped from the hills to make homes for the descendants these pioneers left behind; grass was ploughed under the plains. Wheat, corn, potatoes and cotton replaced the tight soil and the matted grass binder. Nature was stripped bare.

Year after year Nature nursed her grief silently, striving with new undergrowth to repair the ravages man had wrought to her once proud beauty. Finally, when she couldn't stand the pain any longer, she went berserk—centering her wrath at Johnstown, Pennsylvania. Every year since she has somewhere wreaked her revenge on puny man with flood, drought and dust.

Chief H. H. Bennett, of the U. S. Soil Conservation Service, explains it this way:

Pour water on a slanting board. It dashes off immediately. Spread a rug or door-mat over the same inclined surface and most of the water is held back or absorbed. Some of it may run off, but it runs off in a trickle,



An idea of the recent flood that centered its might at Hartford, Conn., can be gained from this picture which shows the havoc wrought when the flood waters receded. Railroad tracks were tossed aside like straws in the grip of a cyclone. Meanwhile in South Dakota (circle), top soil started creeping out of the fields to make highways impassable again.

Dust, nothing but dust. An atmosphere filled with microscopic particles of drifting, sifting silt, covering everything and everybody. Dust, dust, dust.

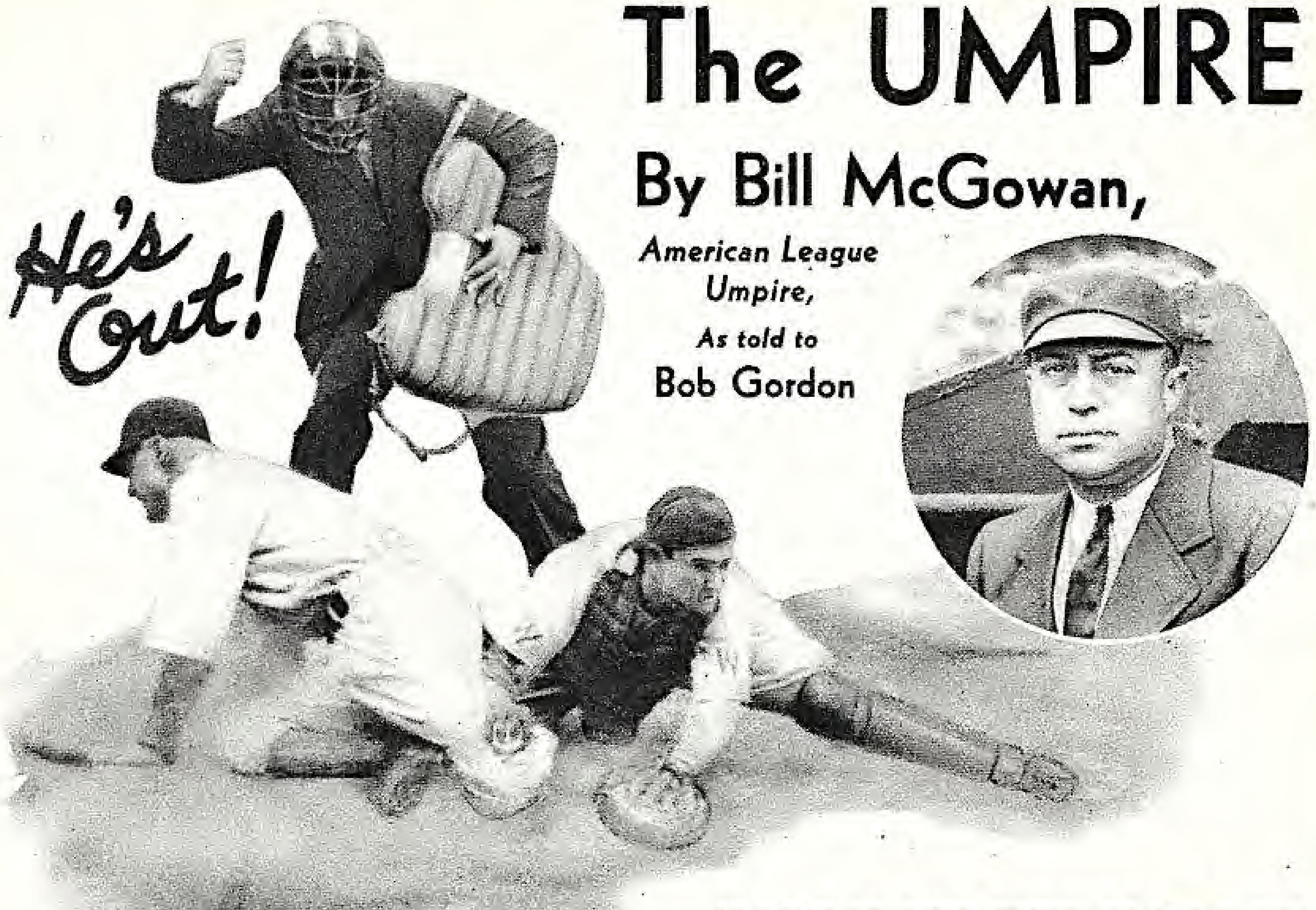
Above—The birth of a flood. A striking and alarming picture of a cloudburst tearing across the land. When covering large areas, floods result. Note the menacing black rain clouds as contrasted with the yellow duster in Colorado as shown below. In this section people have died from dust pneumonia. One cannot tell night from day, so dense is the shrouding dust.

The UMPIRE NEVER SEES the PLATE

By Bill McGowan,

American League
Umpire,
As told to
Bob Gordon

"He's Out!" yells the umpire, and you're out, too—out to "Kill That Umpire!" But get behind the plate with Bill McGowan and see what it takes to call the close ones.



An umpire can usually anticipate just what is going to happen before the play takes place. Circle—Here is Bill McGowan, ace umpire of the American League. No matter how his decision looks to you in the stands, he is ninety-nine per cent right.

"TO TELL you the truth, I never even see the plate. No umpire does."

That admission was dragged out of Bill McGowan, and Bill is a good umpire. He was voted the best umpire of 1935, so he must be good.

I was out to discover the difference between the big league umpire and the sand lot baseball judge, and Bill was just the man to tell me.

"First," began McGowan, "your eyes must be good. And any doctor will tell you that your stomach must function properly or your eyesight suffers. To keep your stomach fit, you must be physically right all over. That is the reason the American League sends its umpires south with the players at the beginning of the season. They must be in perfect shape when the season starts.

When McGowan got around to the mechanics of his job, I thought for a moment that I was taking lessons from a golf pro, for he started talking about stance. Stance seems to be the first fundamental that an expert stresses in practically every physical sport. And as with experts in other sports, the umpires don't agree on details of the stance, but they do insist on balance and a comfortable position. Looking over from 300 to 1,000 pitches in an afternoon is a strain at best.

When the batter steps to the plate the umpire looks him over carefully, noting exactly the height of his shoulder and knee. The shoulder as the player stands erect has no bearing on umpiring at all. It is where the shoulder is while the batter is taking his natural swing that determines whether a pitch is too high to be called a strike.

Frankie Zoeller, who used to lead off for the Atlanta Crackers when McGowan umpired in the Southern League, presented perhaps the smallest target for a pitcher in professional baseball. A midget to start with, he had such an extreme crouch when he swung that the pitcher had very little room in which to get over a strike. Zoeller consequently drew more than his share of free trips to first.

Having sized up the batter, the plate umpire keeps his eye on the pitcher. If there are men on base he must watch for a balk. After stepping onto the rubber and taking his preliminary stretch, when men are on base, the pitcher must hold the ball chest high and do one of three things next—either step toward the plate and deliver the ball to the batter, step toward the occupied base to which he wishes to throw, or step backward out of the box. To do anything else—even to scratch his nose—constitutes a balk and entitles the runners to advance unmolested.

Another example of the umpire's exact timing. (Above) Note his arrival at best spot to check on both runner and baseman in a close play. To him this isn't a close decision, but an easy one.

Those were the happy days, when grand old "Babe" swung on the last strike—and missed. For the runners always took to stealing bases, thus giving the worried catcher something else to worry about.

Once the pitch has started toward the plate, the umpire follows it with his eyes until it plunks into the catcher's mitt. Sometimes the catcher will attempt to "help" his battery mate by quickly pulling in a wide one, then holding his glove so the umpire can see how good the pitch was. The funny part of it is that the catcher usually protests when the umpire calls it a ball.

"That never fools a good umpire," McGowan said. "When a catcher pulls one on me I always call it a ball, because why should he pull a strike? Does he hope to get two strikes on the same pitch?"

"How," I demanded, "do you manage to focus on both the fast-moving ball and the stationary plate?"

He threw up his hands in defeat. "Man," he said, "I never see the plate. I know exactly where it is, but I never see it."

So fans, when the umpire takes out his little broom and dusts off the platter, remember it's so the pitcher can see it, the batter can see it, so you can see it, or perhaps it's only a sanitary gesture.

And that brought up another question. "The rules state," I said, "that if the batter swings his stick across the plate it's a strike whether the ball is across or not. How can you tell if the batter stops his swing in time?"

"Often we can't," McGowan replied. "Gehrig and Lazzeri can start a full swing and stop it by pulling the bat up while it still has full momentum. With my eye on the ball, I often don't know whether or not the bat crossed the plate."

"So what?"

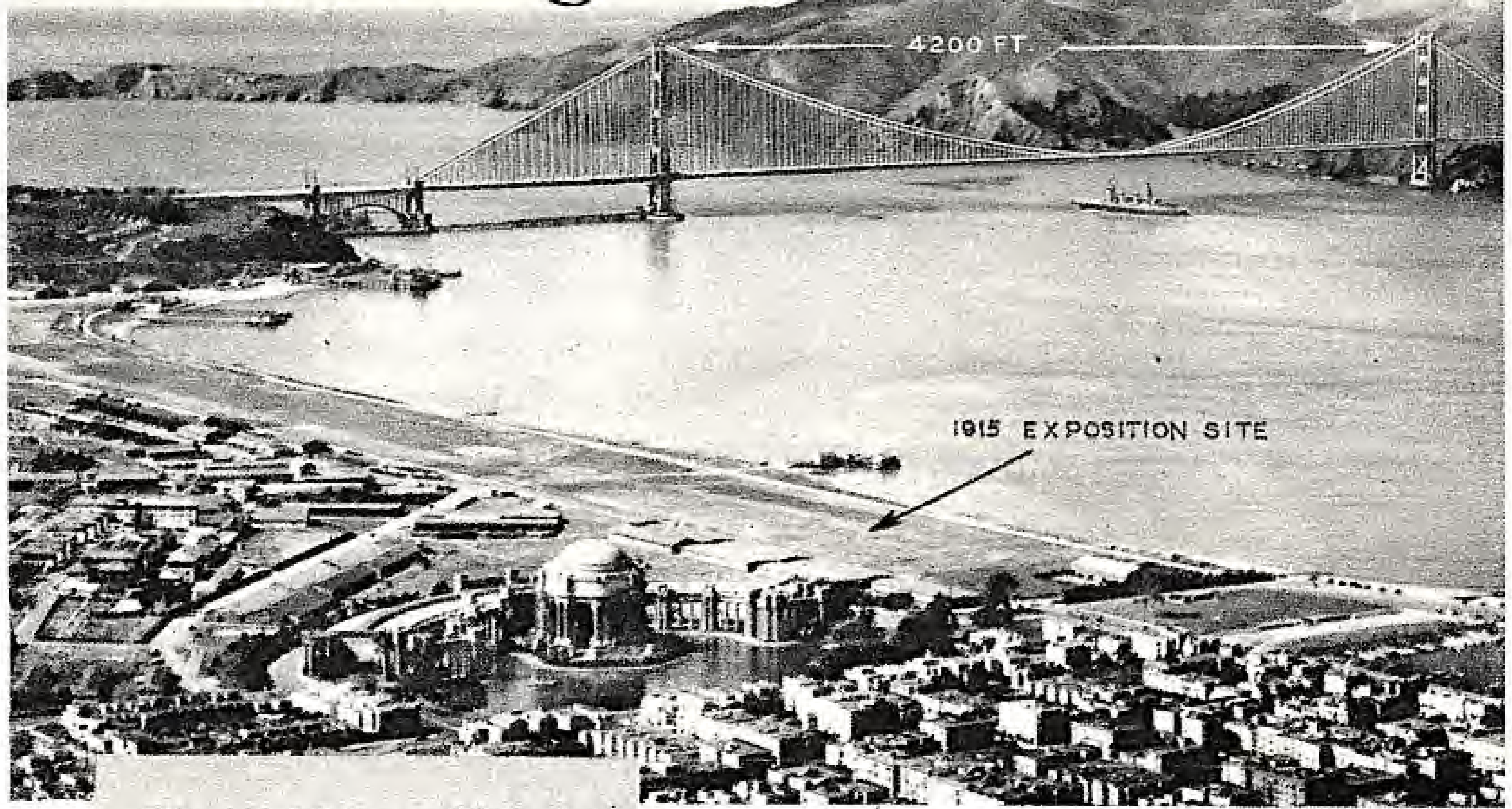
"So I call for help. I shoot a quick glance at the base umpire, and he flashes me the signal. So good is our team work that the fans and players seldom see such signals, which are always perfectly natural movements. I can get the sign on a doubtful half swing and call it without any delay being noticed.

"And that isn't the only signal we have," McGowan continued. "Things sometimes happen so fast on the diamond that an umpire in position for one play is blocked out from

[*Continued on page* 130]

Building Dreams of Steel *In* San Francisco Bay

by
C. W. GEIGER



World's largest and most magnificent single span suspension bridge over the Golden Gate. It is the first bridge ever to be thrown across a major harbor entrance, and when completed in May, 1937, will form the key link in the proposed All-Pacific Coast Highway System.

They said it couldn't be done—span the Bay and Golden Gate with bridges, but San Francisco did it. And threw in a great Exposition to boot. This story tells how the impossible is accomplished.

THE intricate and wondrously knit glittering spans of the world's two greatest bridges across the Golden Gate and Oakland Bay, and a magic isle of Atlantis—dripping with all the miracles of an international exposition, is what San Francisco is preparing for your coming in 1938-39.

The site of the Exposition lies in the white-capped San Francisco-Oakland Bay area, midway between the two cities, on shoal land located just north of the adjoining Yerba Buena Island. And this year 385 acres of shoal will be filled in to provide the site for the Exposition. By the end of 1936, when the fill is completed, architectural plans for the buildings will also be finished, so that actual construction will begin with 1937.

A "natural" for an airport, you think. And you are right. When the Exposition closes, San Francisco will erect there the last word in up-to-the-minute flying terminals, all within just a few minutes bridge ride to the downtown district, or to Oakland proper.

The unique position of this site—a deep-water island—makes it possible for the merchant and naval ships of every nation to drop anchors a stone's throw away. Or, for exhibition purposes, to berth at the site's piers.

The San Francisco-Oakland Bay Bridge is 8½ miles long—figuring the east and west approaches. The bridge proper, including the island crossing, is 23,000 feet long—approximately 4½ miles.

The western half of the bridge is in reality two complete suspension bridges anchored midway between San Francisco and Yerba Buena Island to a concrete anchorage rising 478 feet from the rock beneath the bay floor. Ship clearance of the bridge is from 200 to 218 feet above the surface of low water.

Fit companion to this giant span, is the Golden Gate Bridge now being built to serve San Francisco and the North Bay Redwood Empire. It will be the world's largest and most magnificent single span suspension bridge, and is the first bridge ever to be flung across a major harbor entrance. Its 746-foot towers support a 4,200-foot span. The famed Eiffel Tower of Paris exceeds the towers of the Golden Gate Bridge by a height of only 239 feet. Or, to get nearer home for comparisons, the bridge towers are 191 feet taller than the Washington Monument. Thus, then are two mammoth bridges, where one alone might serve. But California always does things in a great big way.

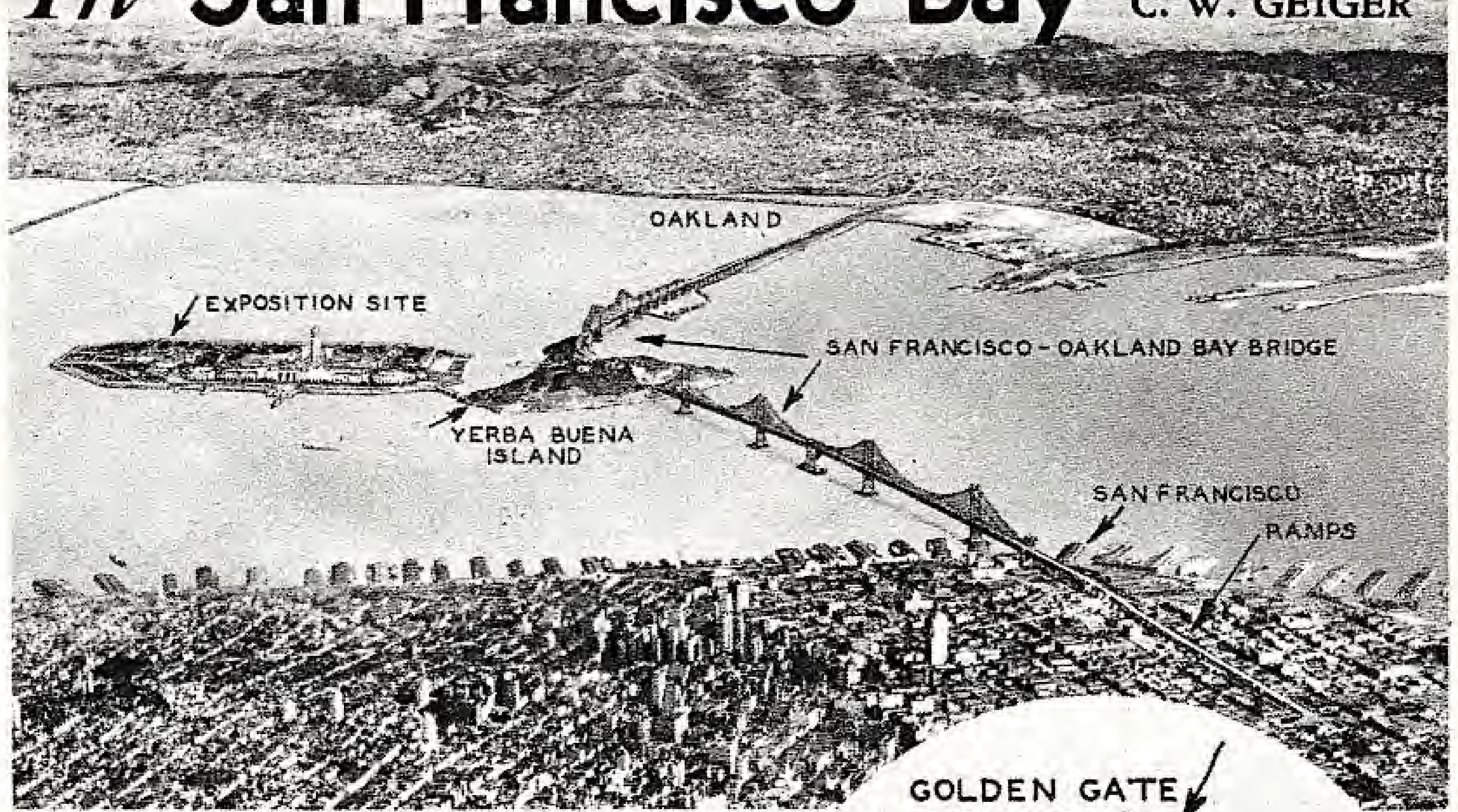
The Oakland commuter today rides on 20-mile-an-hour trolleys to the ferry moles, then spends 20 more minutes ferrying to San Francisco, after which he climbs aboard another trolley to ride uptown to business. Or he comes in on the Sausalito Ferry from the North Bay Redwood Empire, losing even more valuable time.

But under special safety control from a point in Emeryville, the Oakland commuter will soon scoot in subway-type trains at 60 miles an hour to a central San Francisco terminal loop, close to his work, thereby cutting his hours of commutation travel more than half.

The San Francisco-Oakland Bay Bridge riggers are engaged in erecting the longest bridge arms ever attempted by cantilevering—literally pushing steel out into thin air.

The two arms (see illustration) are now a little more than 400 feet long, which means they are rapidly reaching the danger point.

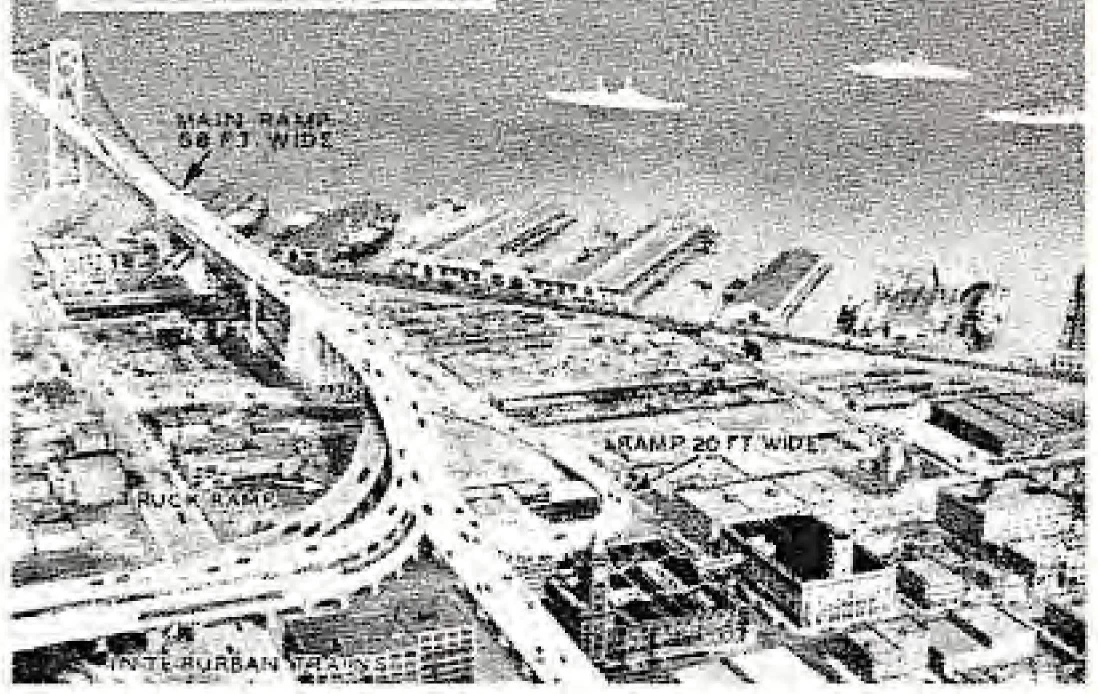
If nothing goes wrong the connection will



The San Francisco-Oakland Bay Bridge spans the largest navigable body of water yet bridged. No other bridge sweeps so high over the ships below. Over eight miles long, the west half of the bridge is in reality two suspension bridges.

GOLDEN GATE BRIDGE
1400 FT.
OAKLAND BAY BRIDGE

Each cantilever arm of the bridge will have to stretch 700 feet over open water before arms connect.



South of Market Street as it will appear in 1938. The bridge comes into San Francisco at a height of 175 feet, and the unique ramps permit traffic to flow in every wanted direction, as shown in the illustration above.

Where to Catch Big Fish

by ROBERT PAGE LINCOLN

The lakes and streams are full of fish this season, but only if you know where to look for them. This article tells you where to look and how to catch your share.

A PROBLEM that confronts many fishermen is that of knowing where to go on a lake or river to find the various species desired. Knowledge of where these fish keep themselves, not only according to the time of season but to the time of day, is the keynote of successful fishing. One can then go to almost any water and find the desired locations with agreeable results.

The large mouth black bass is the chief game fish sought by the fishermen. Unlike the small mouth bass, the large mouth is a lake or pond fish. Its food consists chiefly of minnows that it finds in the shallow water and in among the vegetation. Small sunfish, perch and other small fish are also taken as food by the large mouth. One of the most successful live lures for bass is the baby bullhead with its spines snipped off with a pair of scissors. It is hooked in the skin just back of the dorsal (back) fin and is permitted to swim around.

The large mouth is likely to haunt the deep, inset bays where there are plenty of lily-pads, sunken logs, stumps, brush, etc. It is not unreasonable to say that every sunken log in an inset bay is good for a bass in the summer. They like to lie in the shade of these logs or obstructions, and if your lure is presented to them without stimulating their fear and suspicion, a catch is almost certain. I would say that logs and stumps in the water are two of the safest bets in fishing for the large mouth black bass.

You will find the bass in the bays, among the pads and vegetation, in the very early morning in the summer. As the sun mounts they quit such locations and move into deep water. By ten o'clock you are more likely to find them outside of the inset places as stated, in from fifteen to twenty-five feet of water, where long growing weeds thicket the bottom and reach toward the top. Here a live frog should be used. Oddly enough in such fishing a common cane pole is as good, if not better, than a bait casting outfit. A bobber is used on the line and the lure is kept about four or five feet off of the bottom. Row silently along, moving the frog in an up and down motion, making as little sound as possible.

In the hot weather of July and August you will find the large mouth bass in the habit of schooling up, often as many as fifty or more in a school. At such times they are likely as not to be found off of the reefs or sunken islands in the lakes. These places are generally told by weeds coming up to near the surface where there is deep water all around. The frog is let down fifteen or twenty feet, or according to the depth of the water, and the same slow-rowing process is followed up. Generally if a school is located the limit can be taken in short order. Use medium-sized frogs. When a bass takes the frog he will do so by holding on to the legs and will make a "run" with it, just as a dog does with a bone. He will then stop, and will seek to turn the lure preparatory to swallowing it head first. Generally one counts ten after the bass has definitely stopped swimming with the lure, and then sets the hook. Almost invariably is the bass then hooked. If the hook is set before the bass turns the frog it will be jerked out of the mouth.

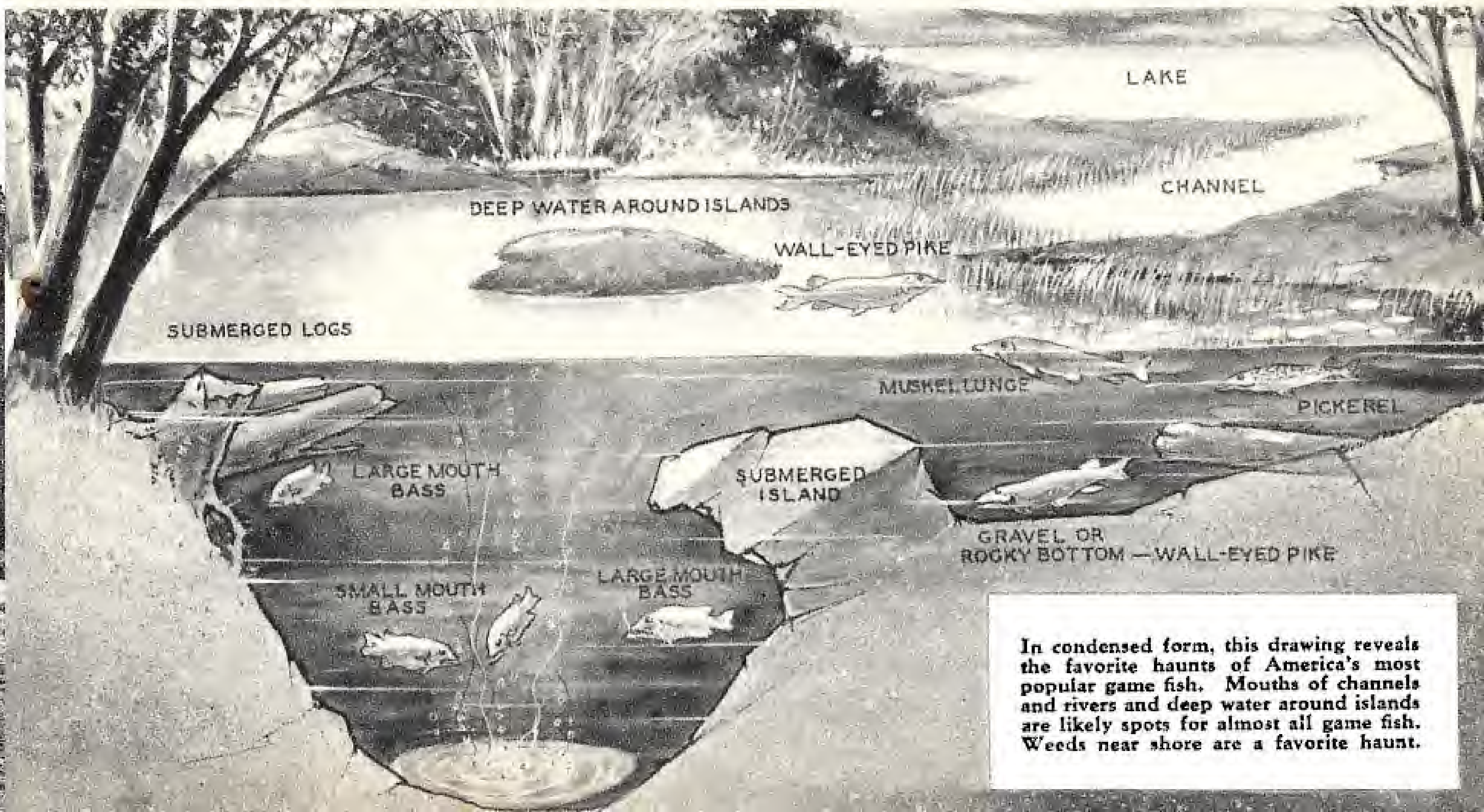
After a day spent in deep water the bass will begin to drift back into the inset bays and shallows at about four o'clock in the afternoon, and continue feeding on into the night often until ten and eleven o'clock. Evening fishing is best with top-water baits, those that boil up the surface, and which delude the fish into believing the lure is some animal swimming. Bass bugs, as used with the fly-rod, are also of exceptional merit at this time.

The small mouth black bass is mostly found in streams, but often, too, in lakes. It does not care much for weedy waters, but clings around those places along the shores where there are rocks and boulders. A pikie type of minnow plug and a pork rind lure are both unexcelled for small mouths.

The small mouth bass is much adverse to staying in shallow water after the sun is high. While the large mouth goes down in the

[*Continued on page 126*]

Left—Robert Page Lincoln went down deep to catch this huge lake trout in Lake of the Woods on the Minnesota border. Below—Water like this is a typical trout habitat. Though trout are more often found in pools, clever casts into shallow riffles often will pay quick rewards to the observant fisherman.



In condensed form, this drawing reveals the favorite haunts of America's most popular game fish. Mouths of channels and rivers and deep water around islands are likely spots for almost all game fish. Weeds near shore are a favorite haunt.

Besting Mother Nature With Home Air Conditioning

by **ALFRED ALBELLI**

AIR conditioning, if the definition is necessary, is anything that is done to the air we live in to relieve the body of exertion—to lessen the strain of living. And the human body is a marvelously automatic machine.

In winter, the body exerts itself to provide warmth. In the heat of summer, just the opposite occurs—with the body always striving to maintain a normal temperature of 98.6 degrees. A refrigerating plant then, as well as a heating plant—cooling itself by evaporating perspiration. And with summer and the "dog days" nearly here, the body comfort derived from man-made air conditioning is easily apparent.

The Sahara-like indoor air of our homes is undoubtedly the greatest single reason for the high winter rate of illness and death. Sufficient moisture in the indoor air—humidification—is of prime importance next to an outside air supply for bodily health.

The costs of the machinery and installation depend on your personal needs and the size of your house. Single portable units start as low as fifty dollars. Initial costs of systems containing all winter air conditioning features are between five hundred and one thousand dollars—again depending on the size and structure of your house. Complete all year round systems range from seventeen hundred to two thousand dollars. There are, of course, more expensive and more complicated systems. The prices quoted are for the simplest systems for the average home of from six to ten rooms.

The operating costs of most winter systems will run about forty to fifty dollars per winter exclusive of heating. The year round systems run between three hundred and six hundred dollars a year to operate, due to the fact that refrigerating systems are much more expensive to install and operate. It must be borne in mind that different localities have different rates for the use of electricity. No prices can be set that would hold throughout the country.

However, it is important to bear in mind the features that do much to offset the expense of installation and upkeep. Namely, the

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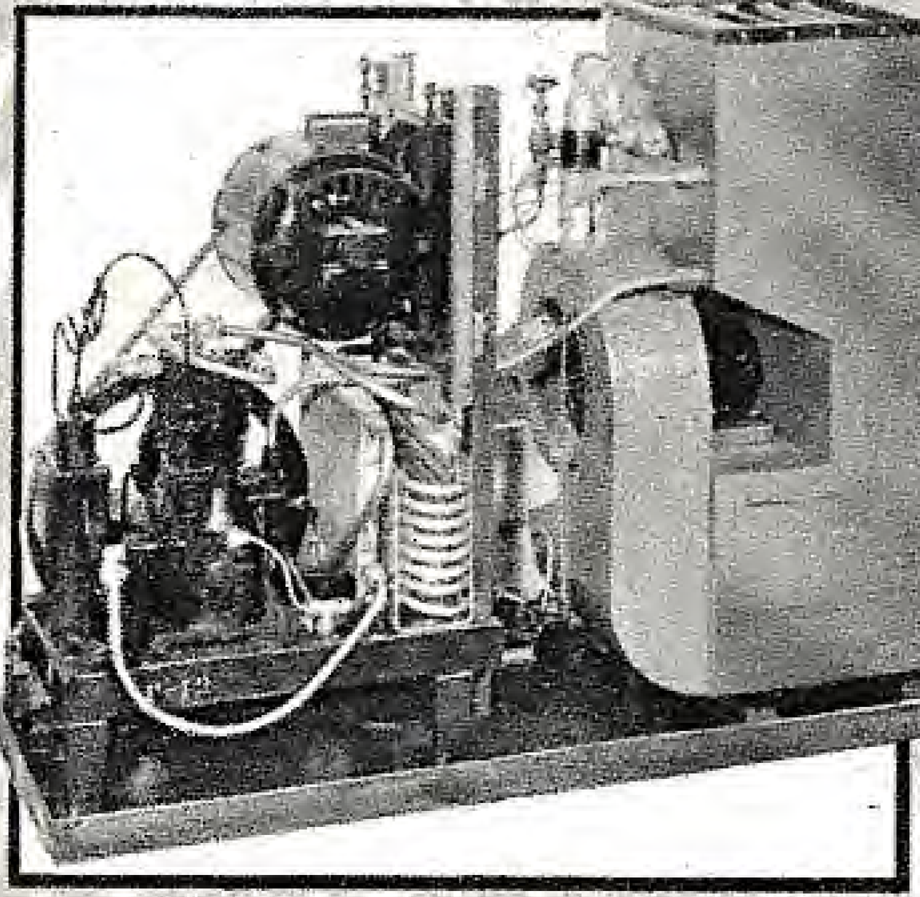
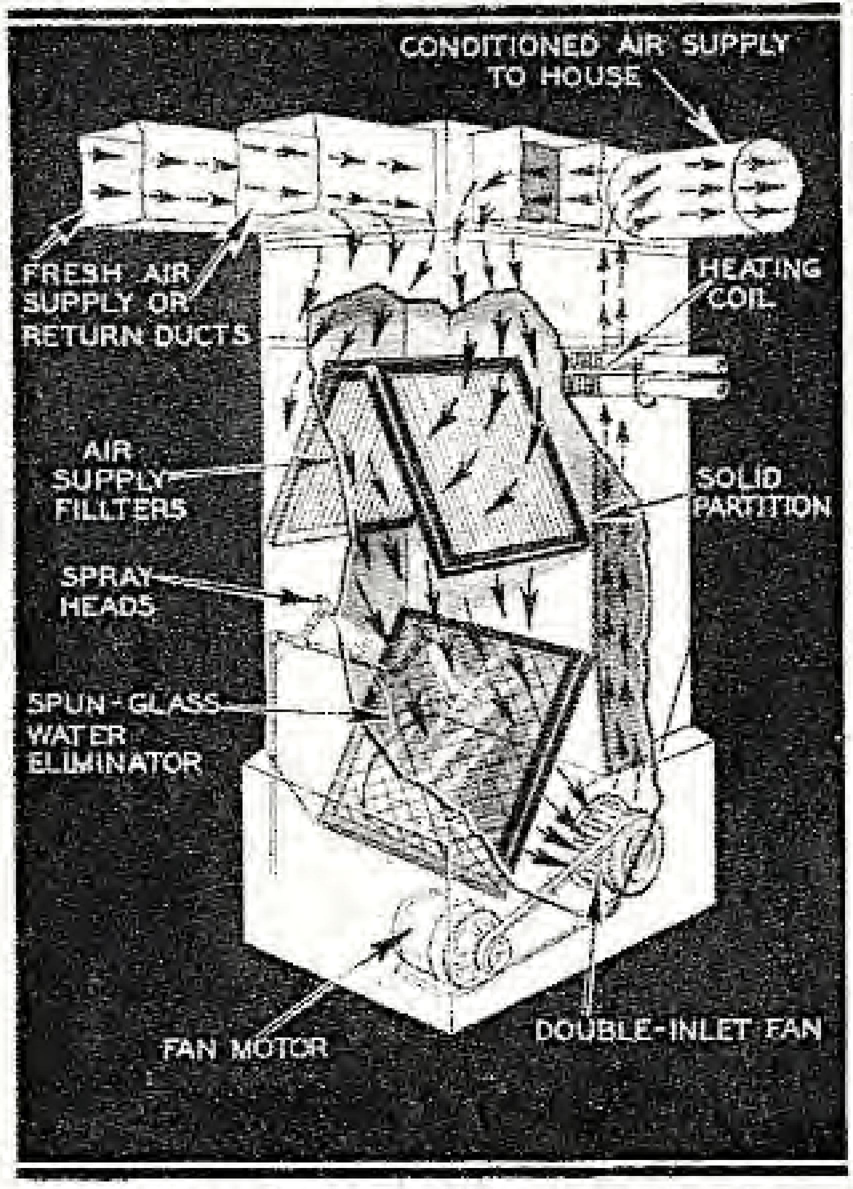


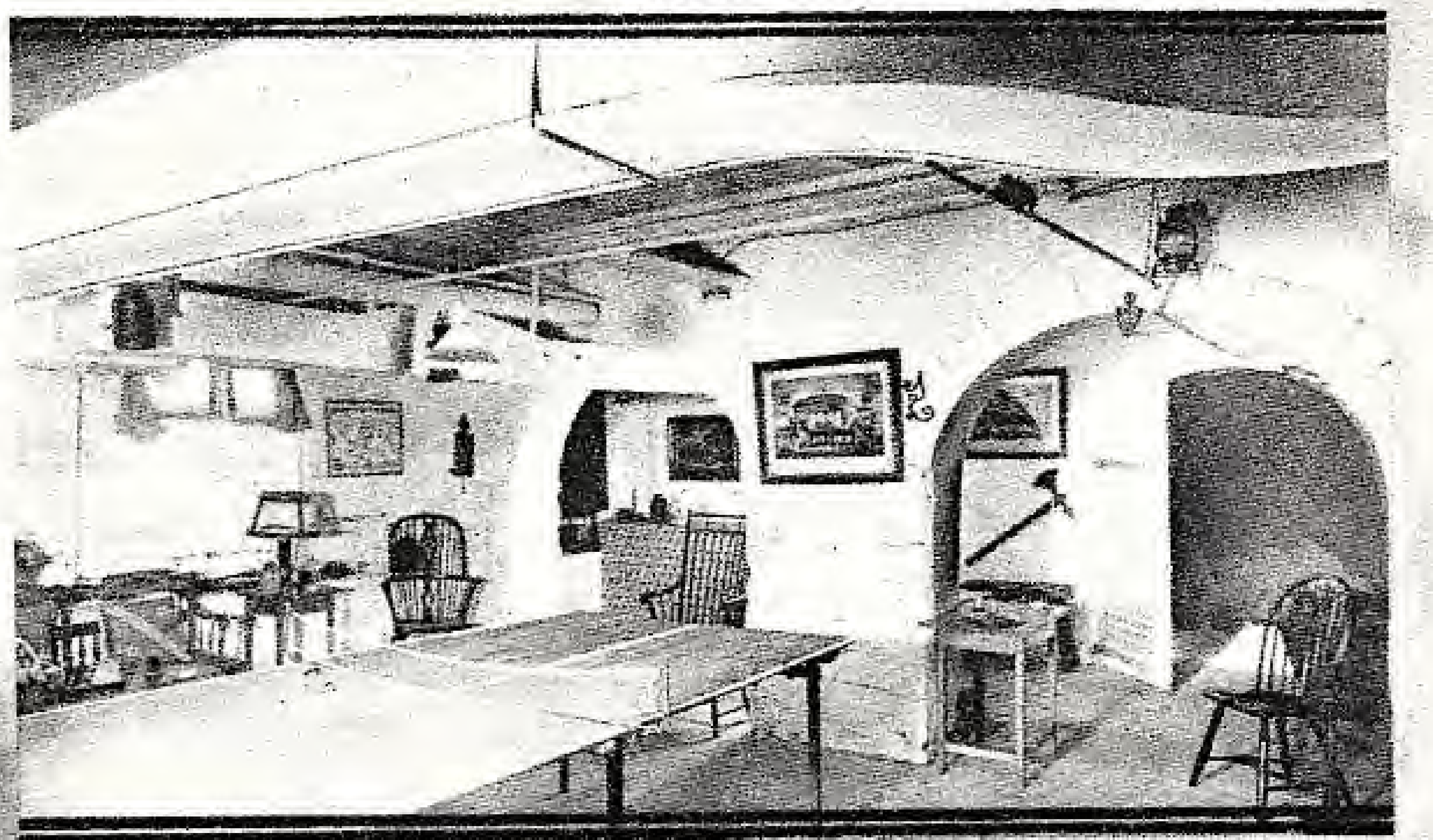
Air conditioning apparatus comes in all shapes and sizes. The portable unit (above), with shell removed, shows the motor, blower and refrigerating units compactly assembled.

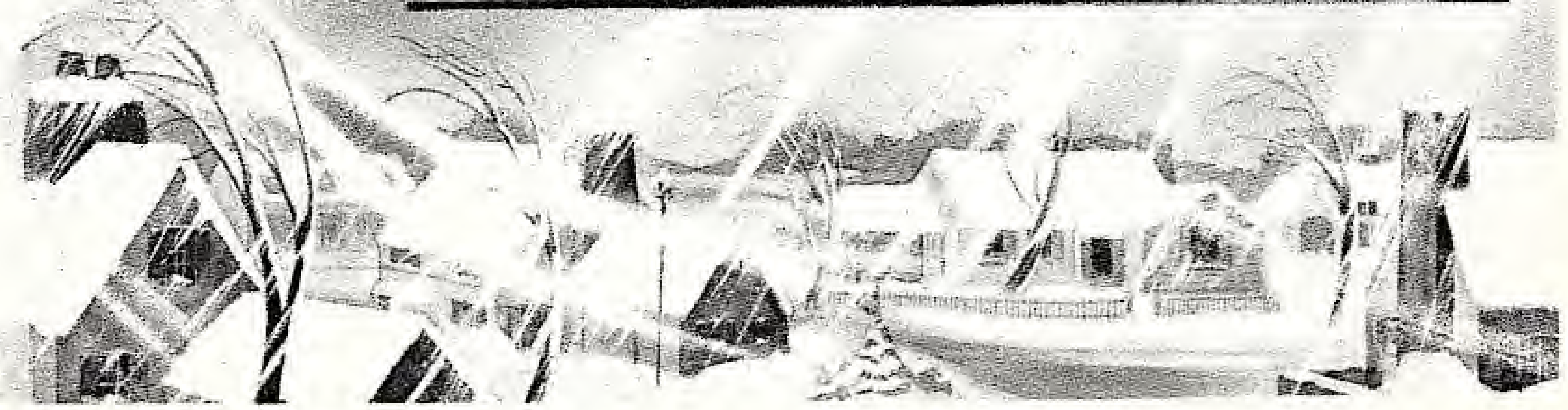
The air conditioner above demands a water connection, for it is operated with hot and cold water at a pressure corresponding to that of the local water main. Despite the hot day, this bungalow is cool, for the volume of air being delivered is sufficient to condition 800 square feet of space, more than enough for this home.

Reducing machinery and operation to its simplest form is much easier than adjusting personal comfort to an accepted average. The diagram illustrates its simplicity.


CONDITIONED AIR SUPPLY TO HOUSE
FRESH AIR SUPPLY OR RETURN DUCTS
HEATING COIL
AIR SUPPLY FILLTERS
SOLID PARTITION
SPRAY HEADS
SPUN-GLASS WATER ELIMINATOR
FAN MOTOR
DOUBLE-INLET FAN

Modern heating and cooling apparatus have added extra living rooms to the house by transforming the once damp cellar or basement into warm comfortable rooms which can be decorated like those upstairs. A complete year-'round air conditioning system, such as glimpsed at the top of the illustration to the right, shows how a modern basement utilizes the air duct for warmth. There is ample head room.





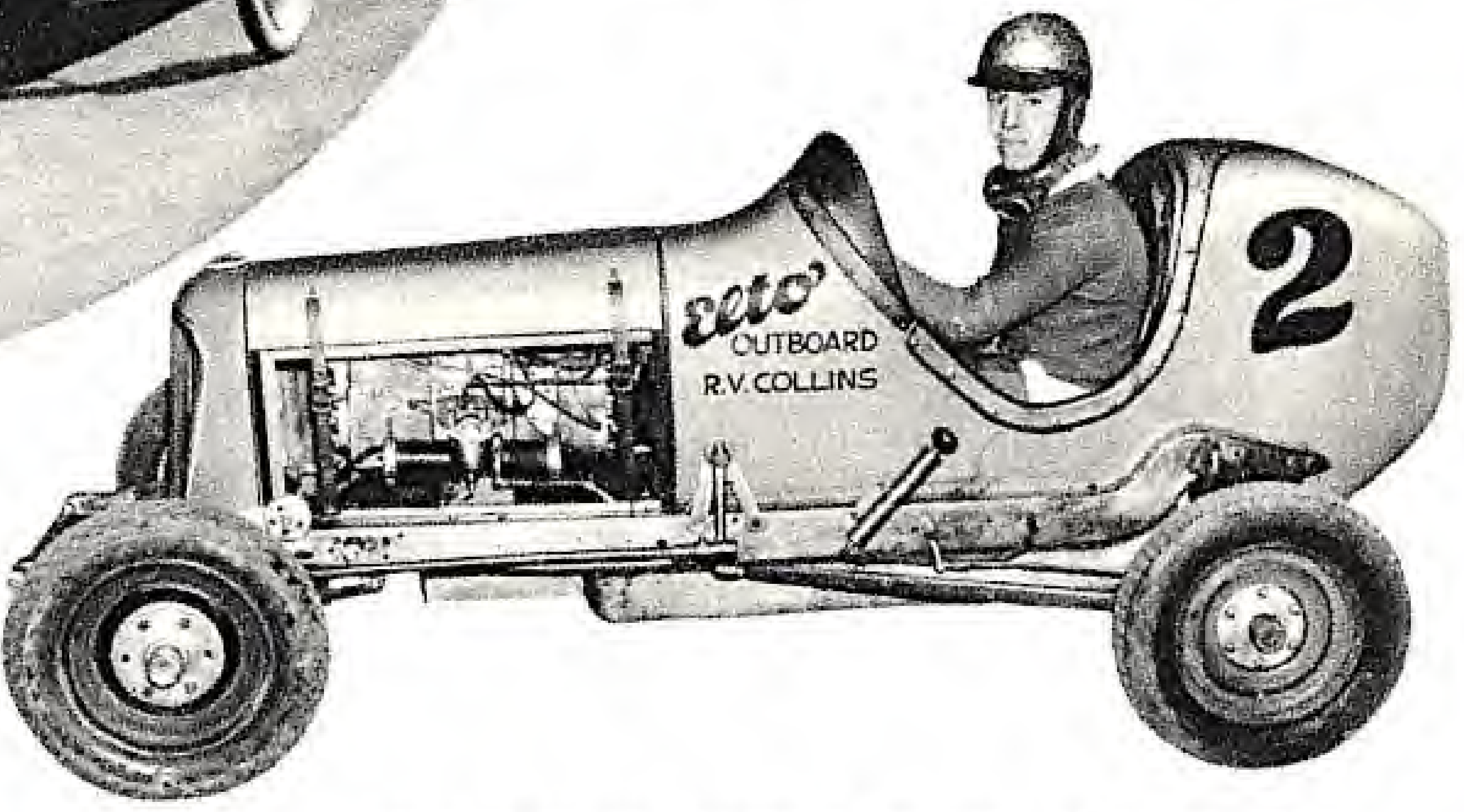
How Soapbox Graduates Build Midget Racers

by

R. V. COLLINS

(Midget Car Builder & Designer)

Midget racing car speedways have caught on with the public, and every speed fan has the urge to buy or make one. This article tells how to build the money-making job.



Time was when youthful imagination made the pushmobile (above) into a pulsing race car. But since the advent of midget auto racers, every boy is wild to own the real thing. But they are expensive propositions, and racing them on in or outdoor tracks is a professional's task. If you are old enough, know mechanics and are capable of financing and building one, the article set forth in these pages will give you an expert's advice. Right—The author of this article in his favorite car.

NOT so many years ago I, too, was building and racing pushmobiles. And the steeper the hill, the faster I went. But somehow this didn't satisfy my craving for speed, for I lived near a great wooden bowl where real race champions rode to hot-tire fame. I wanted a machine powered with a gasoline motor, not imagination. But when midget racing came along . . . well, you will have to take my seat to understand the thrill I get out of it.

Now for the last lap!

You're out ahead of the hurtling pack, with two crack pilots behind fast closing up your lead. Your motor is shrieking its war cry, all those multiple horses under the hood tearing at the leash, pulling you split-seconds closer to the finish line.

Watch that curve, now—watch it! A broadside drift up that dangerous bank, for you missed the track's "groove" again. And you fight gravity and the wheel to line your bus into the straightaway. Push that accelerator through the floorboards, for you're "going to town" with the roar of the crowd in your ears.

There! The checkered flag has slapped against your coasting mount. You've won again! There is no thrill in the world like it.

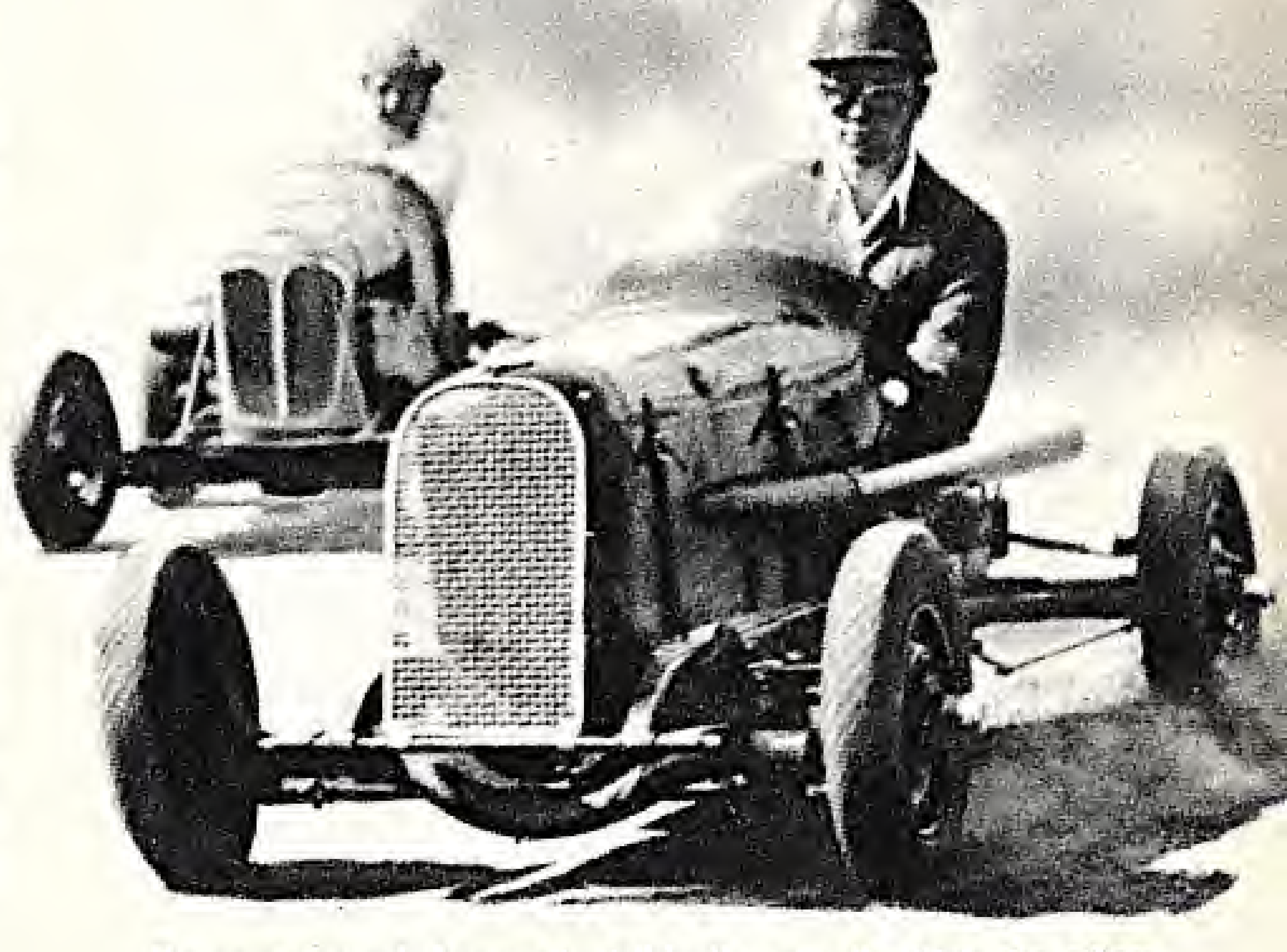
How can you build a midget auto racer? Well, I am asked that question on an average of a hundred times a day. My answer always is: It depends on how good a mechanic you are, and, more important, how you are equipped with funds.

On anything over and above the ⅕-mile race track, the Miller or Offenhauser 4-cylinder 100 cubic inch midget car is supreme. On the shorter tracks, the Elto 4/60 power head accelerates and decelerates much more rapidly, and you can throw them around better. Here is the way I built the successful models I use on the Coast for ⅕-mile competition:

The thread is 45 inches. The wheelbase of the Elto-Collins is 70 inches. The wheels are 20-4 tires. The frame is of 12 gauge body steel, broken to form a channel and hammered out.

The rear axle is either a Model "A" or a Model "T" differential housing, with Model T shaft axles and differential. These are shortened to the required tread width, and the brake drums, those constituting the internal expanding brakes of either a Model T or a Model A Ford are installed at the axle bearing ends with regulation bearings, etc. A radius rod and a spring clamp are fastened in to proper length as in usual Ford practice.

The spring in the rear is a shortened, lightened T spring. In front a leaf spring, semi-elliptical, is used on 18-inch lengths, about three leaves per spring. Usual Ford A front axle, re-cut and welded to tread width, with Ford drag links, etc., is used. Spring perches for the semi-elliptical front springs are welded to the axle.



Every race track has an invisible "groove," which the pilots ride until forced out by competing cars. Then comes the thrill for the spectators—a hurtling car out of control.

The photograph on page 85 shows how all these parts are disposed. The steering wheel is kept small in diameter and fits closely to the dash board.

The power head of the Elto is 60 cubic inches. Since weight must be kept down—everything in midget cars is pounds per horsepower—to give snappy pick-up and quick dying-out on the turns, this type of power head is best for small tracks.

It weighs just 60 lbs. and the Offen-

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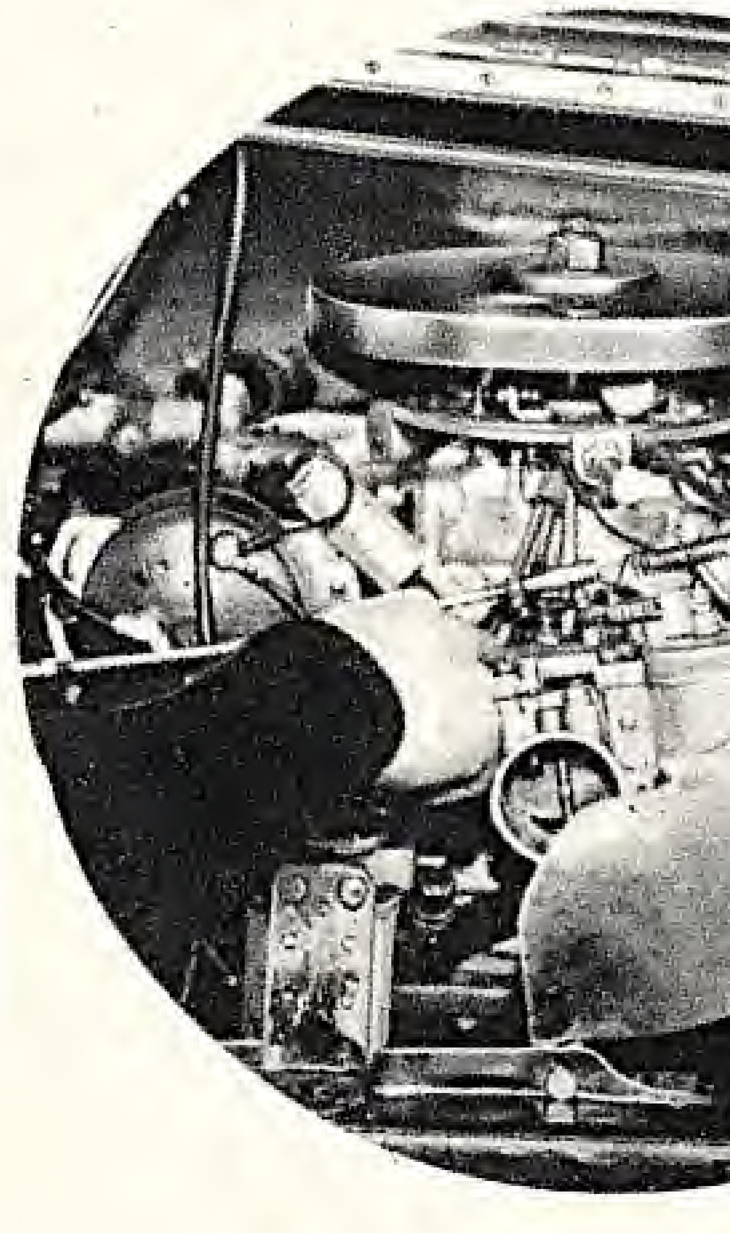
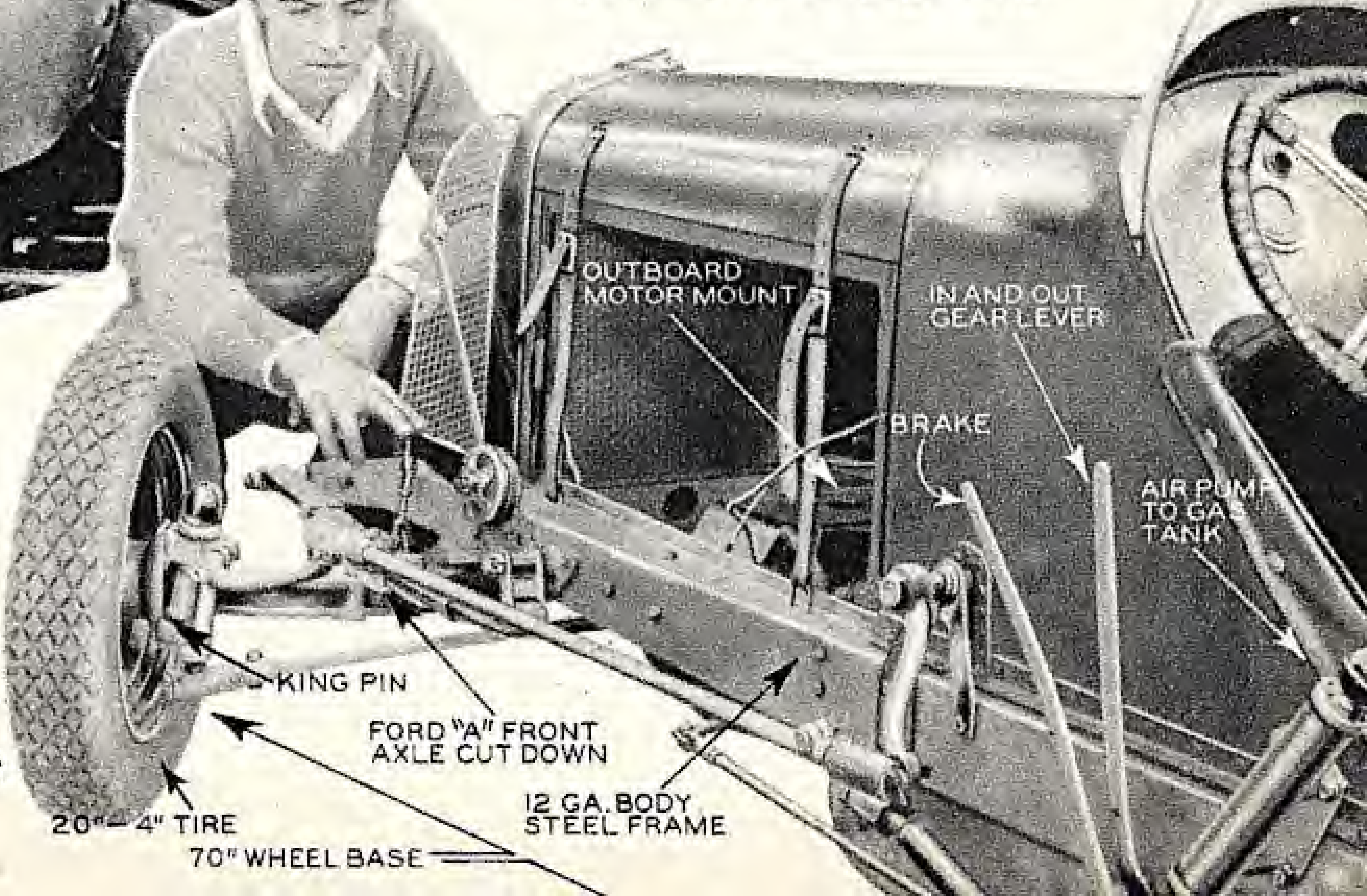
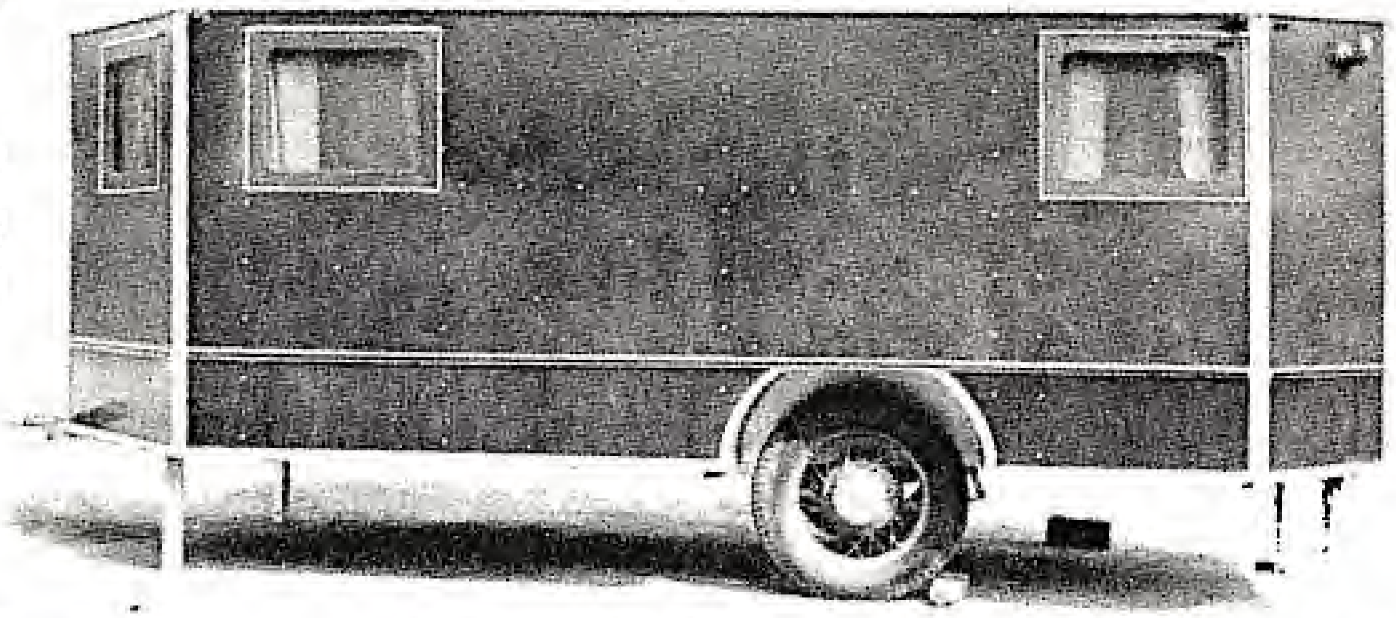




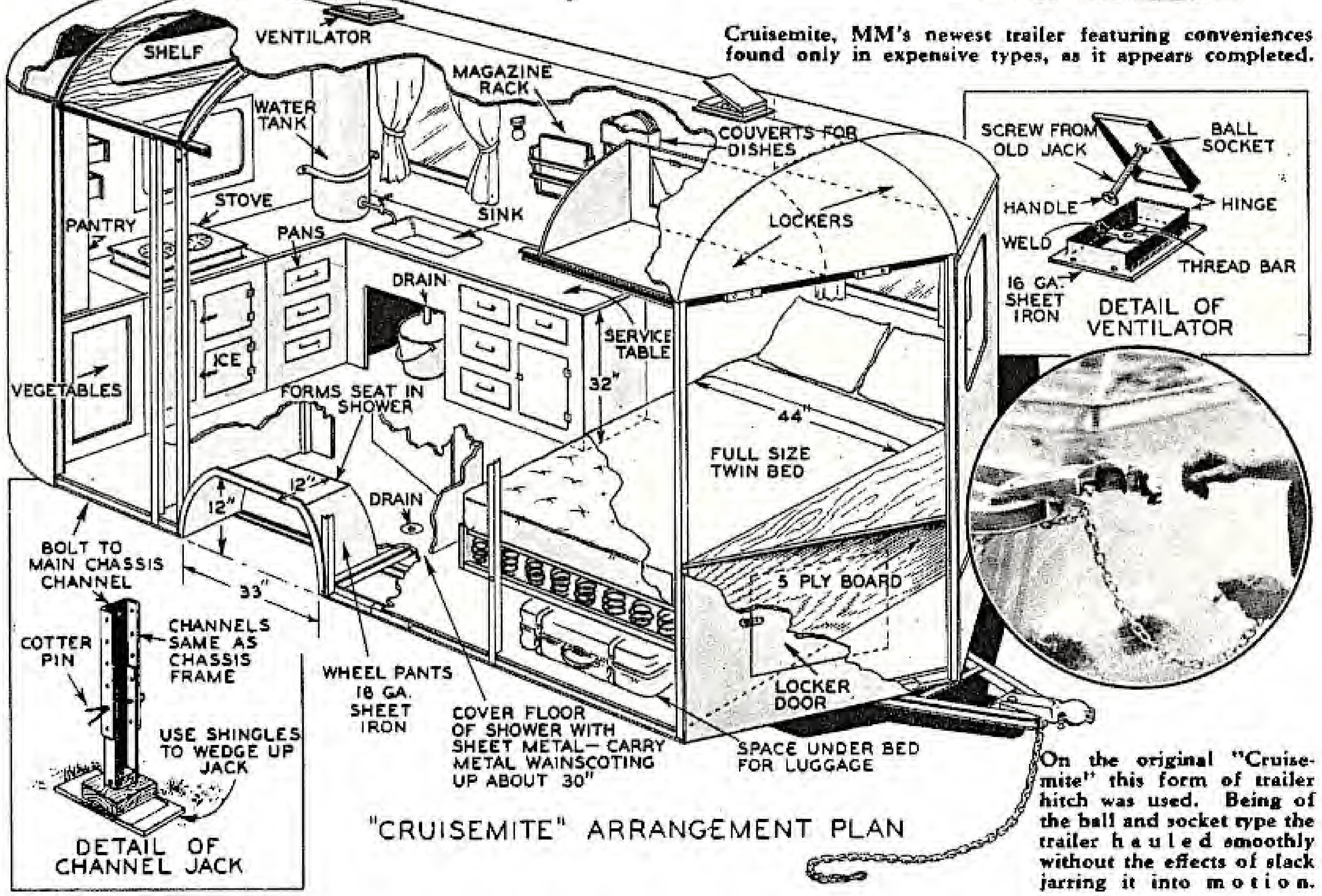
Above is shown the outboard power-head installation as it appears when the midget racer's hood is lifted. To the right (lower illustration) is the left front wheel turned outward to show the front axle assembly, with spring, drag links, etc. Note that the steering wheel is set very close to the dash and that the pressure pump is bolted outside body, so as to be easily accessible.

"CRUISEMITE"–THE IDEAL HIGHWAY TRAILER HOME

Designed for the person whose income is limited this camping coach is unique. It is of all-steel construction, yet costs no more than inferior types.



Cruisemite, MM's newest trailer featuring conveniences found only in expensive types, as it appears completed.


SHELF
VENTILATOR
MAGAZINE RACK
WATER TANK
COUVERTS FOR DISHES
STOVE
SINK
LOCKERS
PANTRY
PANS
DRAIN
SERVICE TABLE
ICE
32"
VEGETABLES
FORMS SEAT IN SHOWER
44"
FULL SIZE TWIN BED
12"
12"
DRAIN
5 PLY BOARD
BOLT TO MAIN CHASSIS CHANNEL
33"
CHANNELS SAME AS CHASSIS FRAME
COTTER PIN
WHEEL PANTS 18 GA. SHEET IRON
LOCKER DOOR
USE SHINGLES TO WEDGE UP JACK
COVER FLOOR OF SHOWER WITH SHEET METAL— CARRY METAL WAINSCOTING UP ABOUT 30"
SPACE UNDER BED FOR LUGGAGE
SCREW FROM OLD JACK
BALL SOCKET
HANDLE
HINGE
WELD
THREAD BAR
16 GA. SHEET IRON

DETAIL OF VENTILATOR

DETAIL OF CHANNEL JACK

"CRUISEMITE" ARRANGEMENT PLAN

On the original "Cruisemite" this form of trailer hitch was used. Being of the ball and socket type the trailer hauled smoothly without the effects of slack jarring it into motion.

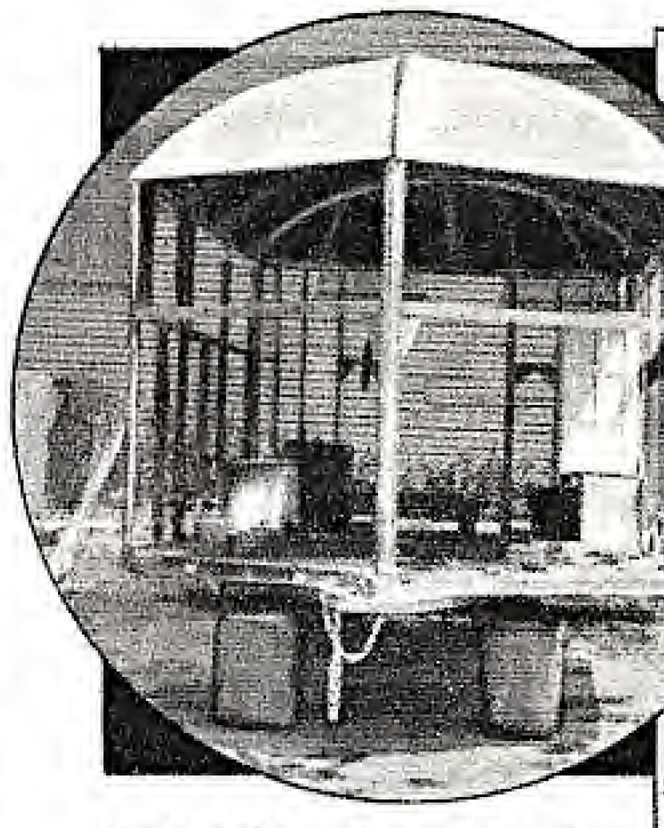
THE trailer industry having grown by leaps and bounds during the past few years it is difficult to determine just which type to build. While there are streamline trailers, folding trailers, long trailers, semi-trailers and any number of in between types "Cruisemite" is a practical coach for home construction. It has been seasoned by thorough testing and free from undesirable features.

"Cruisemite" may be built in several ways, with any number of interior plans. That's half the fun of building a trailer: planning the interior yourself. A good standard layout is shown in the plans.

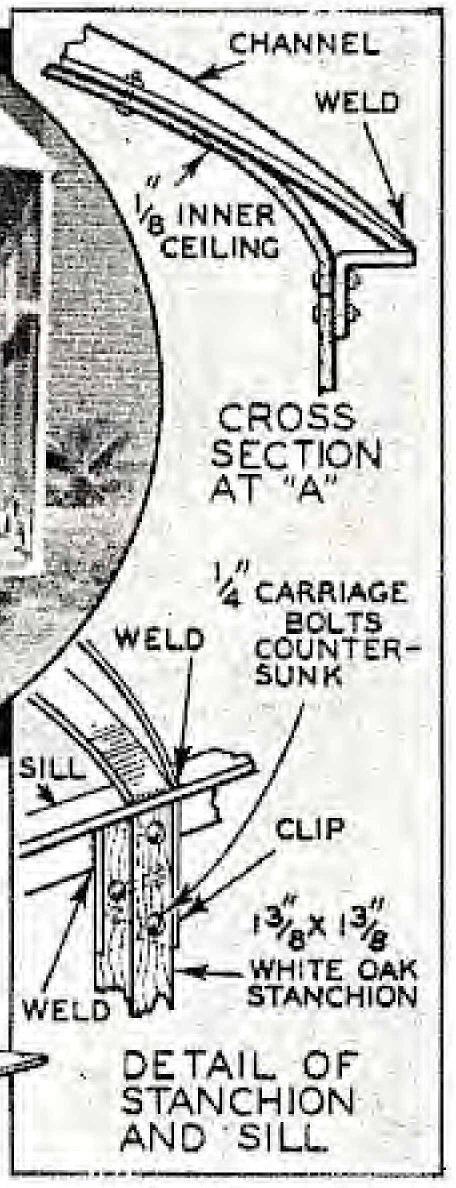
The secret of the easy-to-build part of "Cruisemite" is that she has a steel chassis roof frame. This is welded up out of standard steel channels and angles obtainable at any building supply dealer. A blacksmith can be called upon to bend up the materials and weld the frames. Being of steel, "Cruisemite's" construction is very strong, as well as being very light.

The main chassis frame is of channel iron of 2½" deep as shown on the perspective drawing. Lay out the half breadth dimensions and chassis frame lengths in chalk on the cement floor of the garage. Have the channel bent in the middle and at section B to coincide with the floor plan. The bend in the middle is to a radius of 8", making a sixteen-inch loop into which the trailer hitch is later fastened.

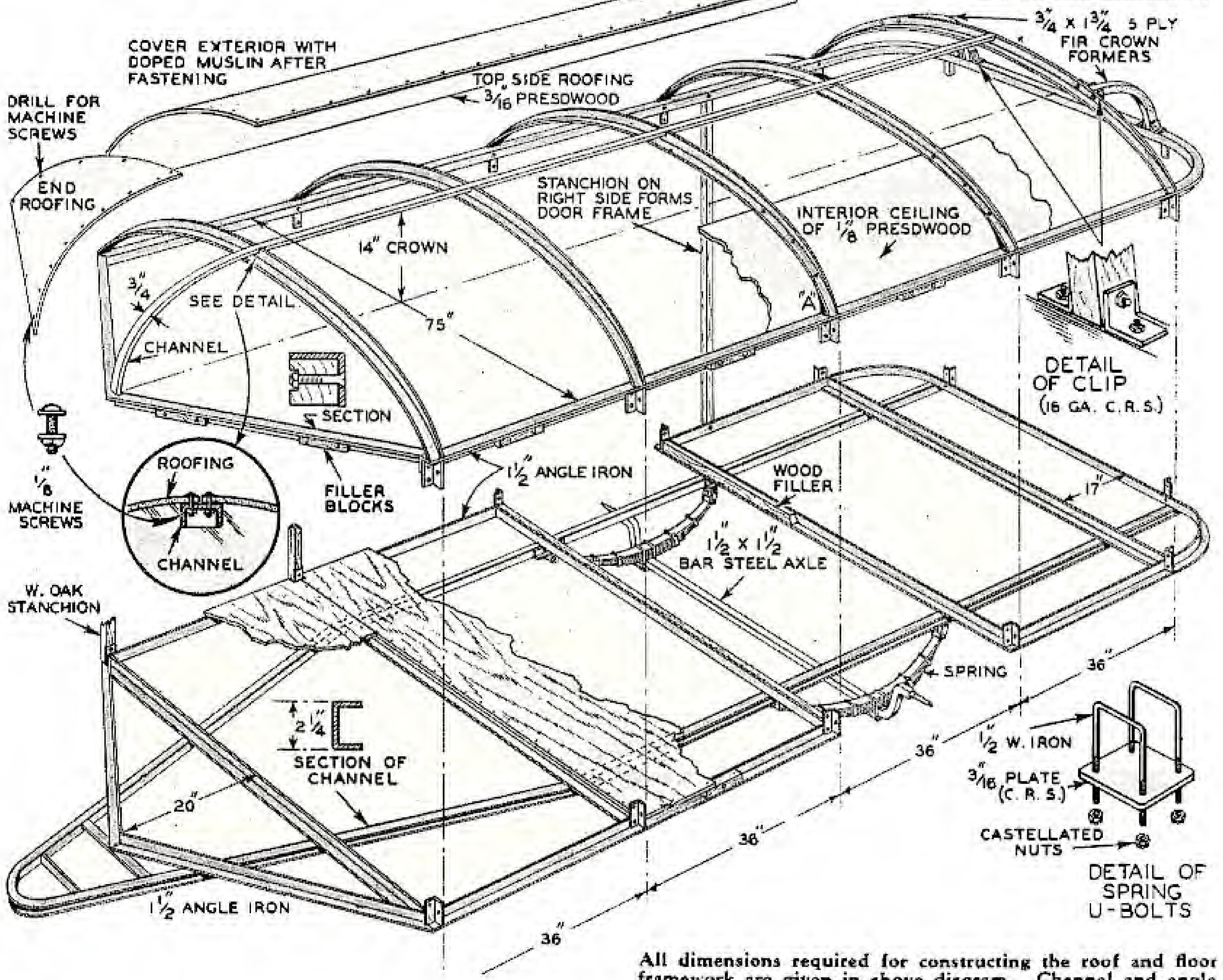
Lay the main chassis frame on the floor, and using the chalk outlines as a guide, weld in the cross members, the outside edge angle iron as shown on the drawings and also the clips. These clips are of the same material, 1⅜" by 1⅜" angle iron and about 4" long. When this work has been completed turn the frame upside down and weld in the angle irons and the plates for the spring perches. The spring used is a 28" Chevrolet truck type with 4" shackles to allow a soft riding motion. Install these as shown then install the axle and the wheels.



Here is the trailer as it appears before ceiling process has been started. Note the roof in place.


CHANNEL
WELD
1/8" INNER CEILING
CROSS SECTION AT "A"
1/4" CARRIAGE BOLTS COUNTER-SUNK
WELD
SILL
CLIP
1⅜" x 1⅜"
WHITE OAK STANCHION
WELD

DETAIL OF STANCHION AND SILL


COVER EXTERIOR WITH DOPED MUSLIN AFTER FASTENING
DRILL FOR MACHINE SCREWS
TOP SIDE ROOFING 3/16" PRESDWOOD
3/4" x 1 3/4" 5 PLY FIR CROWN FORMERS
END ROOFING
STANCHION ON RIGHT SIDE FORMS DOOR FRAME
INTERIOR CEILING OF 1/8" PRESDWOOD
14" CROWN
3/4"
SEE DETAIL
75"
"A"
CHANNEL
SECTION
1/8" MACHINE SCREWS
ROOFING
CHANNEL
FILLER BLOCKS
1½" ANGLE IRON
WOOD FILLER
17"
1½" x 1½" BAR STEEL AXLE
W. OAK STANCHION
SPRING
36"
2¼"
SECTION OF CHANNEL
1/2" W. IRON
3/16" PLATE (C. R. S.)
CASTELLATED NUTS
20"
36"
36"
1½" ANGLE IRON
36"

DETAIL OF CLIP (16 GA. C.R.S.)

DETAIL OF SPRING U-BOLTS

All dimensions required for constructing the roof and floor framework are given in above diagram. Channel and angle iron welded to the required forms constitute the chassis.

IMPROVING *the* GARDEN *with* OUTDOOR FURNITURE

by HI SIBLEY

THE most ordinary of backyards can be vastly improved in appearance and comfort simply by the introduction of garden furniture and a few well-placed trellises to serve as screens. From the suggestions given here any home-owner can very easily build his own lawn decorations, altering them if necessary to suit individual needs.

For use in the shaded pergola a low coffee table of interesting design was constructed entirely from the heavy floor joists of an old school building which had been torn down to make way for new structures. Anyone can easily duplicate this in unsurfaced 2-inch planks, which can be adzed or roughly shaped with a sharp hatchet to take off the sharp edges and give them a hand-hewn effect. Its extreme simplicity of construction, as illustrated in the perspective drawing, gives it a rugged charm.

A chair can be built to go with the coffee-table if desired. Easily moved about on the two wooden wheels, the chair has an adjustable back for the comfort of the "passenger." To give the proper impression of age it, too, should be roughened and the workmanship should be more or less crude.

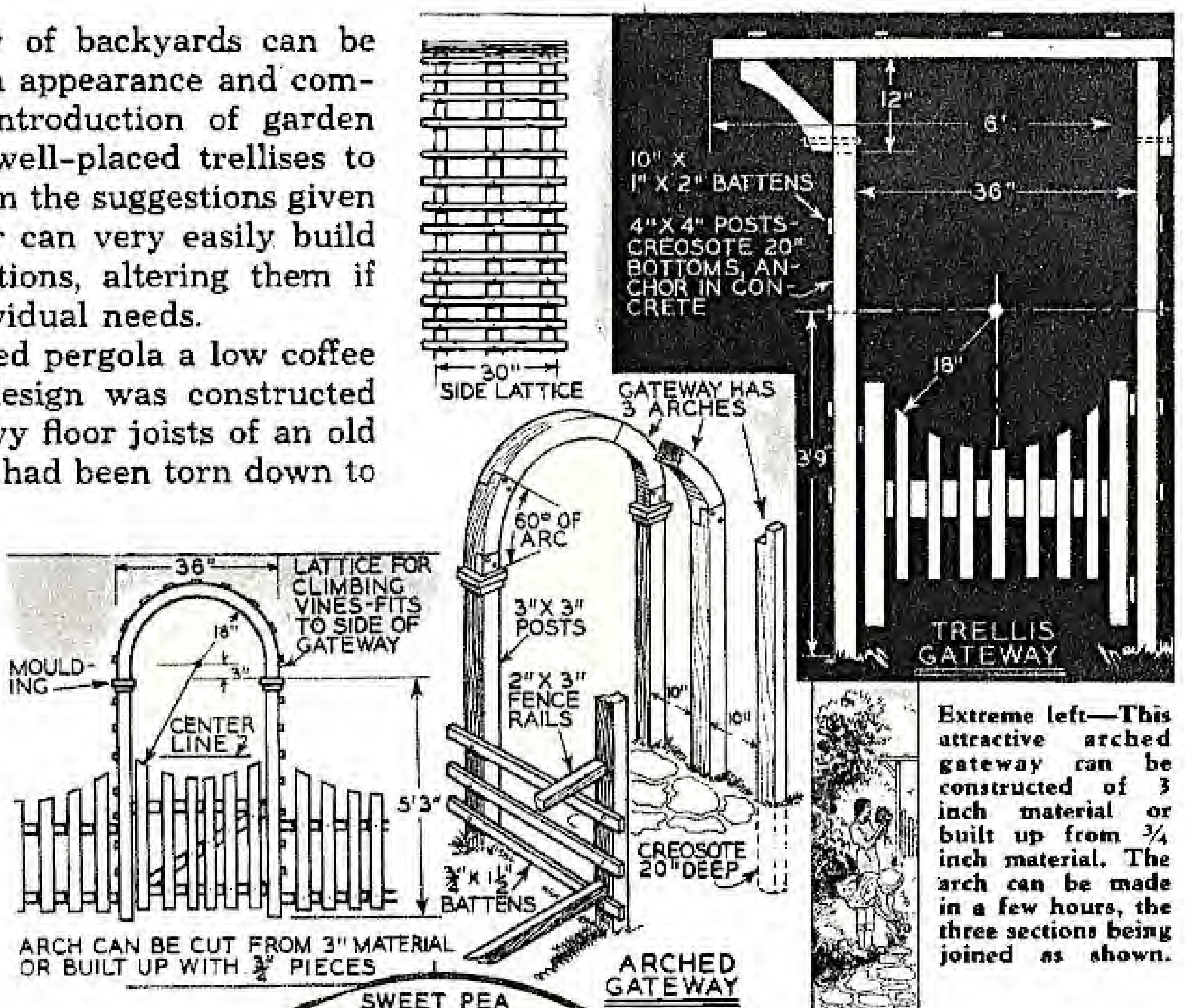
The pioneer settee is another interesting project that is suitable for terrace, verandah or patio. In all of the foregoing pieces lag screws are used in construction and these should be galvanized or thoroughly painted. By doing so, the furniture will last for several generations.

The novel Barrow Seat lends an interesting touch to any garden. Its construction requires only the simplest kind of carpentry. The curved seat-back can be cut with a coping saw if a scroll or jig saw is not available.

Make the wheel of 1-inch or thicker pine, with ¾-inch cleats. The latter should not be cut with geometrical precision; a rough job throughout seems to fit in with a garden setting. The wheel is not intended to turn as the barrow is a stationary fixture. A piece of pipe or pitchfork handle serves as the axle.

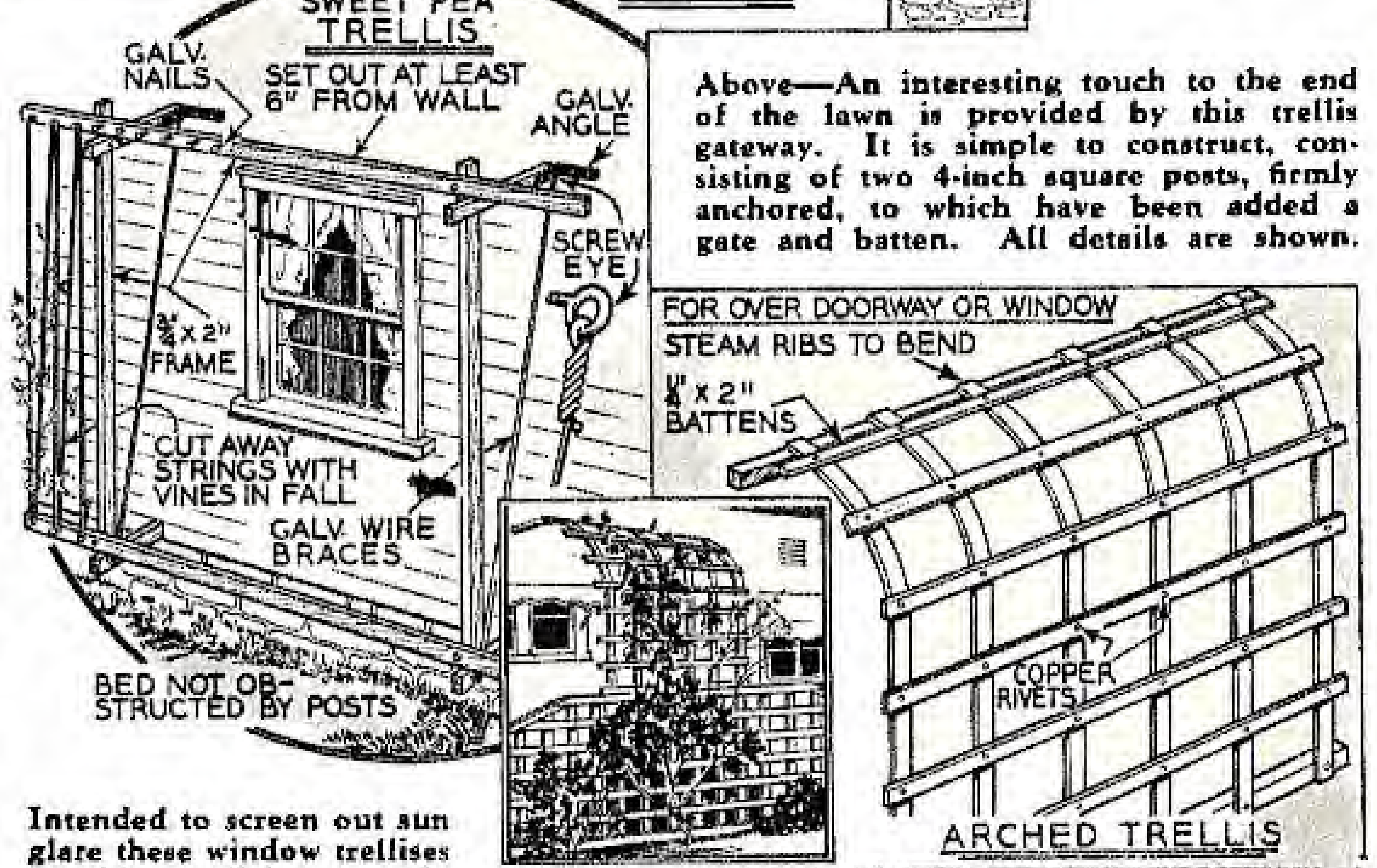
Build the flooring directly upon the two two-by-two sills and erect the seat back and flower box upon it. Bore a few ¼-inch holes in the bottom of the flower box and coat the inside with tar paint to prevent rot. Reinforce the corners with triangular cleats as shown. Finish with a coat of white paint.

Trellises also add much to the beauty of a home's surroundings. An unusually inviting arched gateway can be built up of ¾-inch scroll-sawed segments screwed together.

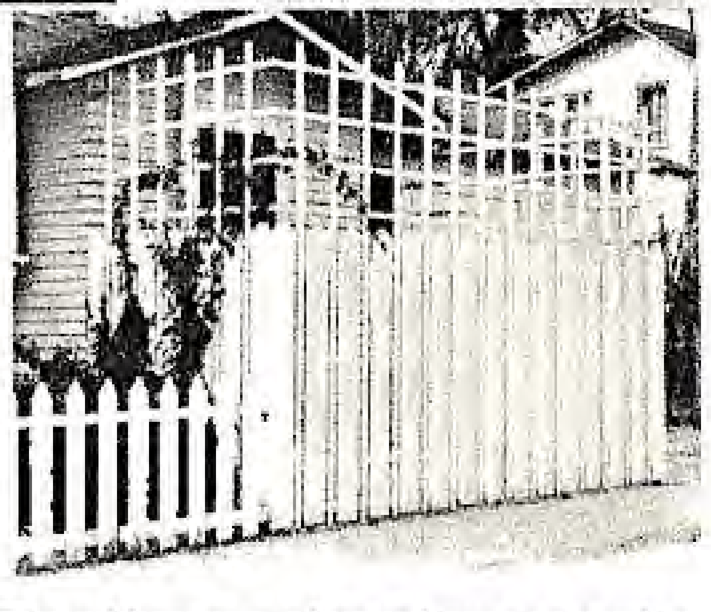

10" X
1" X 2" BATTENS
4"X 4" POSTS-CREOSOTE 20" BOTTOMS, ANCHOR IN CONCRETE
12"
6'
36"
18"
3'9"
30"
SIDE LATTICE
TRELLIS GATEWAY
GATEWAY HAS 3 ARCHES
60° OF ARC
3"X 3" POSTS
2"X 3" FENCE RAILS
10"
CREOSOTE 20" DEEP
36"
LATTICE FOR CLIMBING VINES-FITS TO SIDE OF GATEWAY
18"
MOULDING
CENTER LINE
5'3"
¾"X 1½" BATTENS
ARCH CAN BE CUT FROM 3" MATERIAL OR BUILT UP WITH ¾" PIECES
ARCHED GATEWAY

Extreme left—This attractive arched gateway can be constructed of 3 inch material or built up from ¾ inch material. The arch can be made in a few hours, the three sections being joined as shown.

Above—An interesting touch to the end of the lawn is provided by this trellis gateway. It is simple to construct, consisting of two 4-inch square posts, firmly anchored, to which have been added a gate and batten. All details are shown.

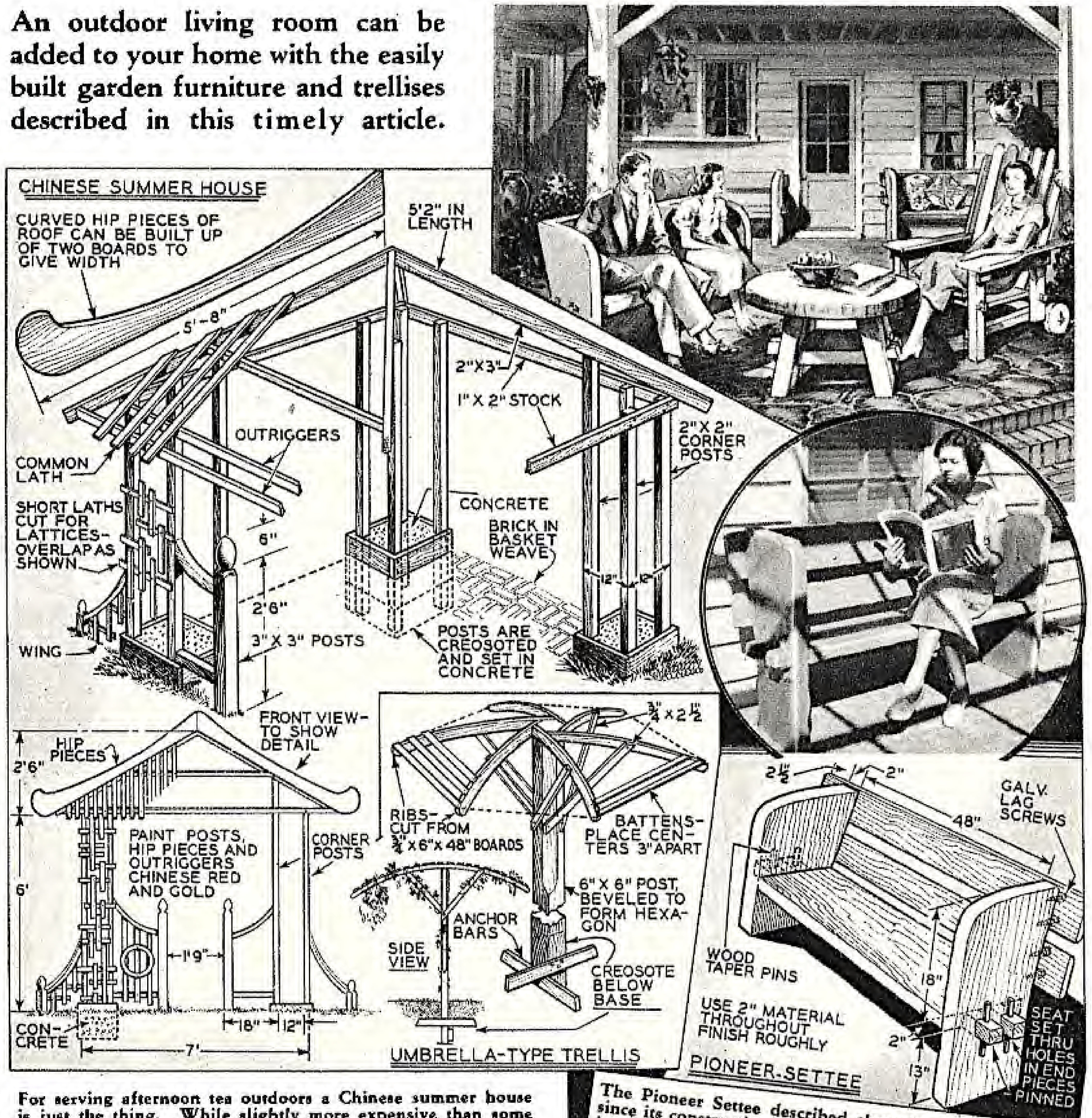

SWEET PEA TRELLIS
GALV. NAILS
SET OUT AT LEAST 6" FROM WALL
GALV. ANGLE
SCREW EYE
¾"x 2" FRAME
CUT AWAY STRINGS WITH VINES IN FALL
GALV. WIRE BRACES
BED NOT OBSTRUCTED BY POSTS
FOR OVER DOORWAY OR WINDOW
STEAM RIBS TO BEND
¼"x 2" BATTENS
COPPER RIVETS
ARCHED TRELLIS

Intended to screen out sun glare these window trellises provide a living curtain throughout summer months. The builder has his choice of curved or string type trellis as shown. String type is especially suited for sweet peas and similar vines.



The odd corners of your house or garden will provide a delightful spot for this combination picket fence and trellis.

An outdoor living room can be added to your home with the easily built garden furniture and trellises described in this timely article.


CHINESE SUMMER HOUSE
CURVED HIP PIECES OF ROOF CAN BE BUILT UP OF TWO BOARDS TO GIVE WIDTH
5'2" IN LENGTH
5'-8"
2"X3"
1"X 2" STOCK
OUTRIGGERS
COMMON LATH
SHORT LATHS CUT FOR LATTICES-OVERLAP AS SHOWN
2"X 2" CORNER POSTS
CONCRETE
BRICK IN BASKET WEAVE
6"
12"
2'6"
3"X 3" POSTS
WING
POSTS ARE CREOSOTED AND SET IN CONCRETE
FRONT VIEW-TO SHOW DETAIL
HIP PIECES
2'6"
6'
PAINT POSTS, HIP PIECES AND OUTRIGGERS CHINESE RED AND GOLD
CORNER POSTS
1'9"
CON-CRETE
18"
12"
7'
SIDE VIEW
¾"x 2½"
RIBS-CUT FROM ¾"X 6"X 48" BOARDS
BATTENS-PLACE CENTERS 3" APART
6"X 6" POST, BEVELED TO FORM HEXAGON
ANCHOR BARS
CREOSOTE BELOW BASE
UMBRELLA-TYPE TRELLIS
2½"
2"
48"
GALV. LAG SCREWS
WOOD TAPER PINS
18"
USE 2" MATERIAL THROUGHOUT FINISH ROUGHLY
2"
13"
SEAT SET THRU HOLES IN END PIECES PINNED
PIONEER-SETTEE

The Pioneer Settee described above is simple to build since its construction is intended to be rough. The seat is attached to the end pieces with tapered wooden pins giving it a true pioneer appearance. Attach the two back pieces to the rest of the settee with large galvanized wood screws. Construct the entire project from two inch unfinished stock.

For serving afternoon tea outdoors a Chinese summer house is just the thing. While slightly more expensive than some of the other projects it is well worth the investment. Involving only simple construction work the summer house should not require more than one day to build. It may be finished off by trimming the hip pieces, gate posts and outriggers in bright Chinese red paint spotted with gold.

• • •

The Umbrella-Type trellis, shown at the right, will do much to add charm to a barren spot in the backyard lawn. Only one upright post is required to support it; the vines clinging to the umbrella-like ribs attached to the post. To prevent the post from rotting paint with asphalt compound or creosote.

PLANS FOR "BUZZER" A Fourteen-Foot RUNABOUT

designed by

E. E. REED

CLIPPING over the water at a rate of 44 miles per hour in a seaworthy runabout built by yourself at a total cost of $30 is thrilling fun. There is not only the thrill resulting from speed, but also the pride of ownership—the pride of having constructed a boat that in its class is second to none—and the pride of having done so with a minimum of expense.

The minimum of expense in this case is low; the boat is Buzzer; the designer and builder constructed it as the result of a wager that he could do it with no more than $30 expenditure for materials.

It might easily be called a table top runabout or a floating bedstead, for into its construction went eight long table leaves, (44") and almost a complete oak bedstead. Also into its construction went selected boards from crating and boxes, several old auto seats and a conglomerate collection of junk-yard odds and ends.

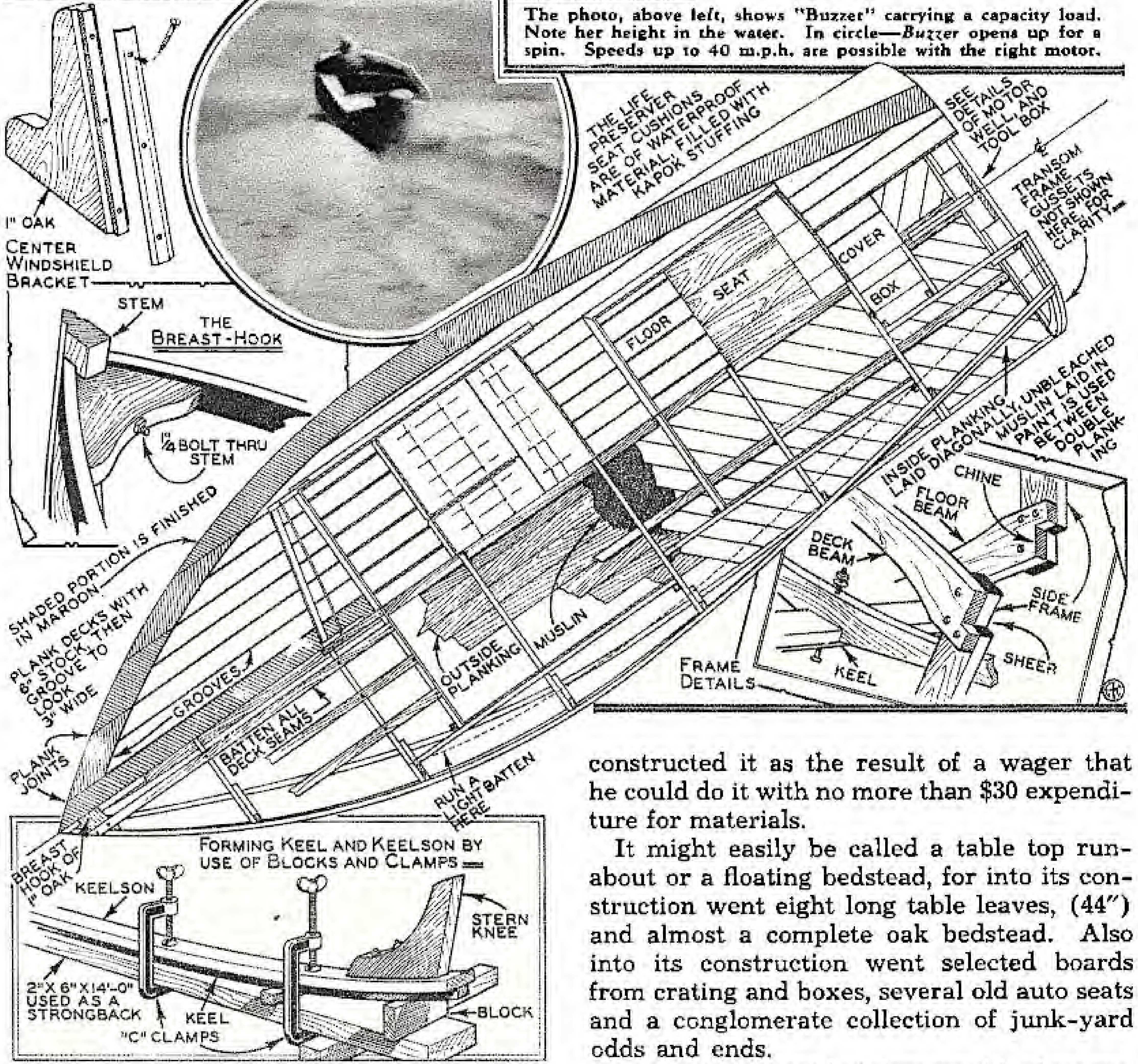
Professional boat builders would, of course, scoff at the waste of time involved in collecting materials for *Buzzers.* Thus the building instructions given here are directed to the amateur who wishes to save money and who has all winter to build his boat. If instructions are followed implicitly, the result will be as sturdy a little boat as ever was launched with a speed that varies with the size of motor desired.

The keel and Keelson of *Buzzer* are made of straight-grained yellow pine. The stem is made of oak. These pieces form the primary step in the building of *Buzzer.* All are primed with white lead and oil and clamped to the form as shown in diagram. They are secured there by carriage bolts passed through keel, keelson and frame.

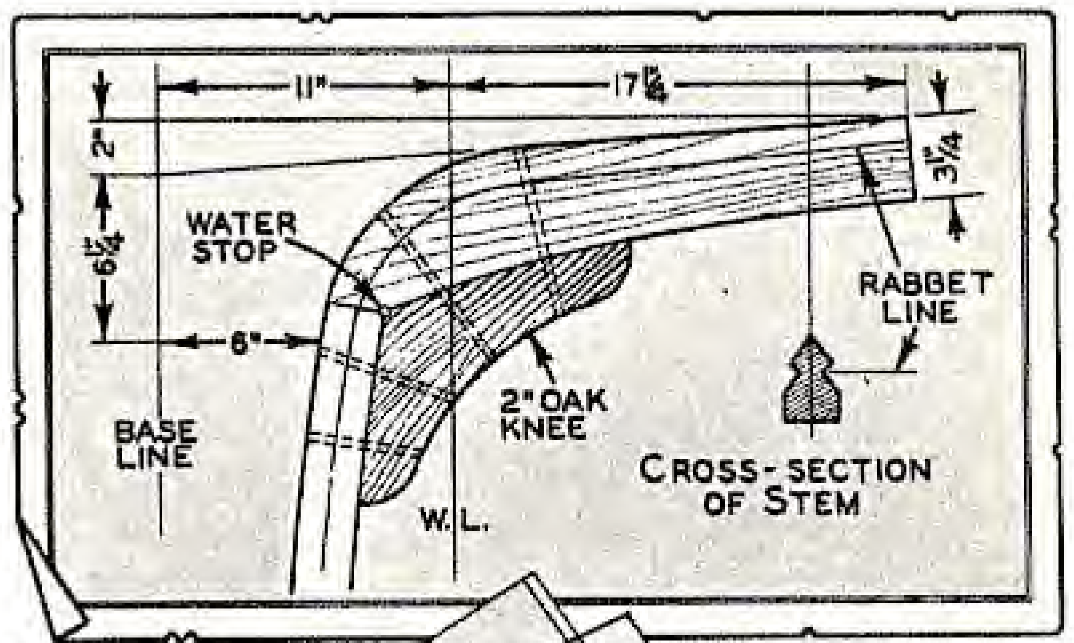
Whereas yellow pine is chosen for other members because it is sturdy and easy to work, the stem must be of oak. Any good scrap piece of two-inch oak will do.

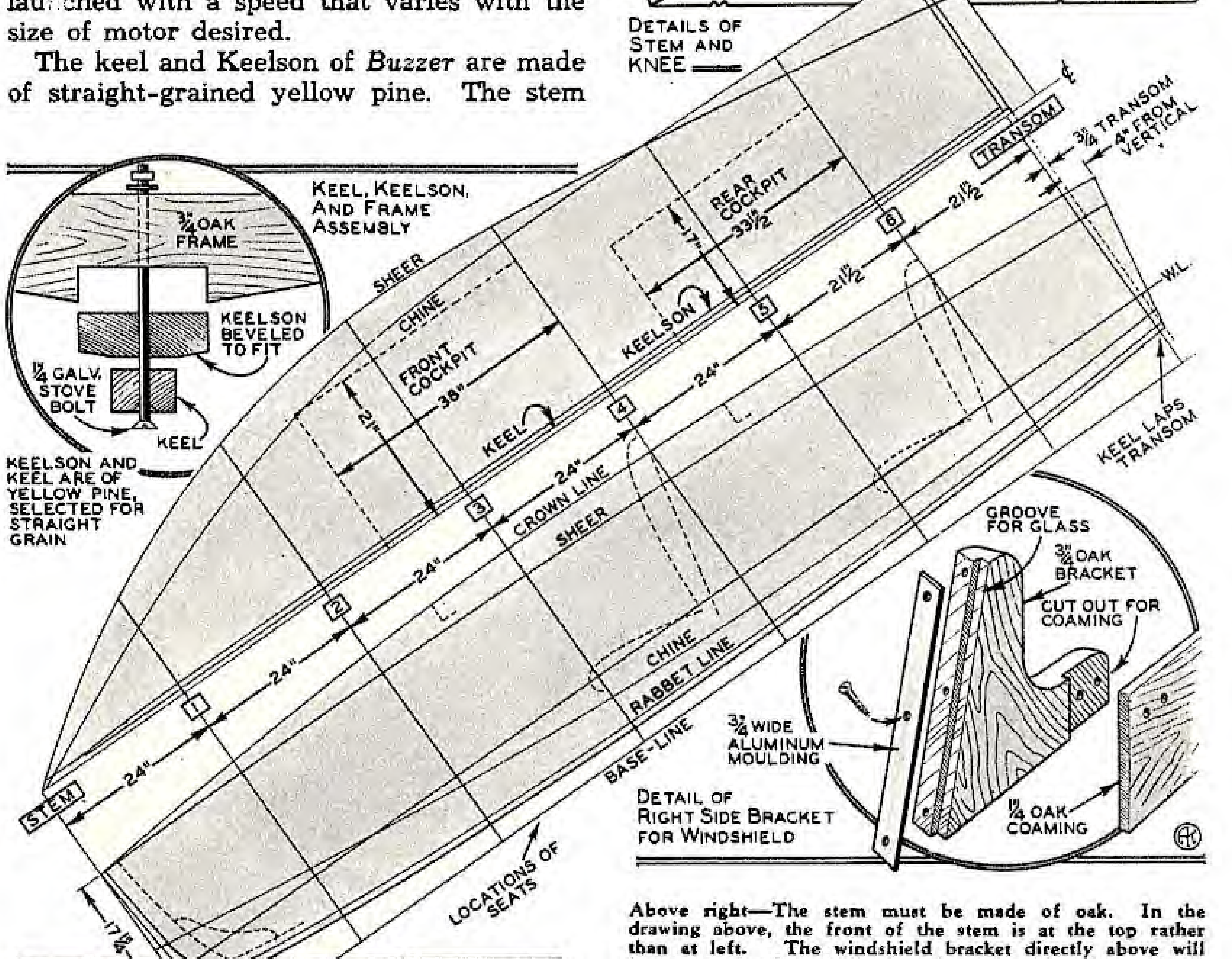
The form of which Buzzer was built was

The photo, above left, shows "Buzzer" carrying a capacity load. Note her height in the water. In circle—*Buzzer* opens up for a spin. Speeds up to 40 m.p.h. are possible with the right motor.

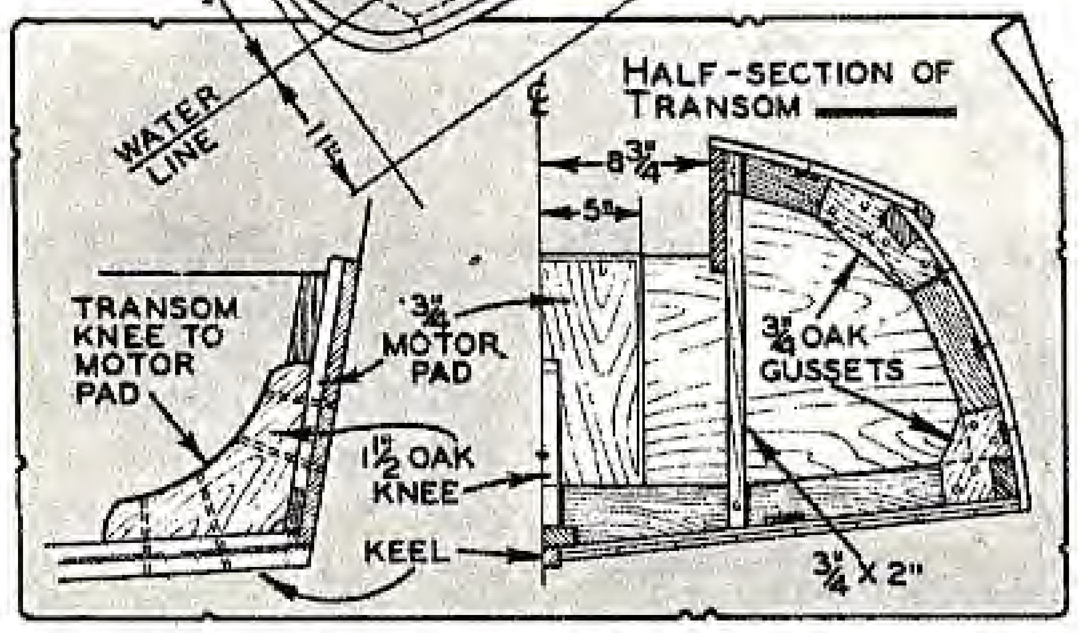

1" OAK
CENTER WINDSHIELD BRACKET
STEM
THE BREAST-HOOK
¼ BOLT THRU STEM
THE LIFE PRESERVER SEAT CUSHIONS ARE OF WATERPROOF MATERIAL, FILLED WITH KAPOK STUFFING
SEE DETAILS OF MOTOR WELL AND TOOL BOX
TRANSOM FRAME GUSSETS NOT SHOWN HERE FOR CLARITY
FLOOR
SEAT
COVER
BOX
INSIDE PLANKING, LAID DIAGONALLY, UNBLEACHED MUSLIN LAID IN PAINT IS USED BETWEEN DOUBLE PLANKING
CHINE
FLOOR BEAM
DECK BEAM
SIDE FRAME
SHEER
KEEL
FRAME DETAILS
MUSLIN
OUTSIDE PLANKING
SHADED PORTION IS FINISHED IN MAROON
PLANK DECKS WITH 6" STOCK, THEN GROOVE TO LOOK 3" WIDE
GROOVES
BATTEN ALL DECK SEAMS
PLANK JOINTS
RUN A LIGHT BATTEN HERE
BREAST HOOK OF OAK
FORMING KEEL AND KEELSON BY USE OF BLOCKS AND CLAMPS
KEELSON
STERN KNEE
2"X 6"X14'-0" USED AS A STRONGBACK
KEEL
"C" CLAMPS
BLOCK

Above are shown the top profile and several construction details. Note the double planking of the bottom with the painted muslin between. The grooves in decking are made with a file.


11"
17¾
2"
6¼
3¼
WATER STOP
RABBET LINE
6"
BASE LINE
2" OAK KNEE
W.L.
CROSS-SECTION OF STEM

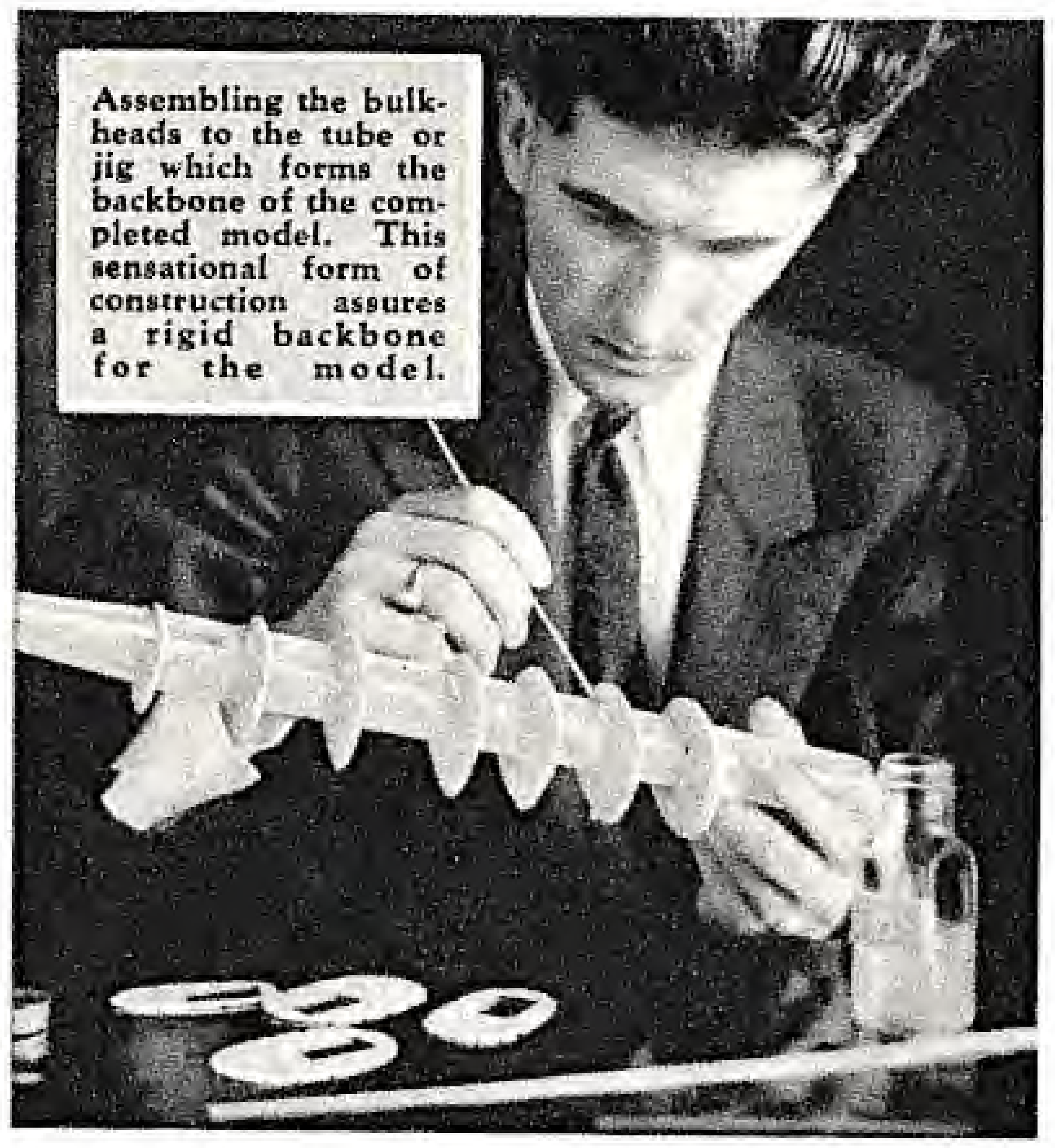

DETAILS OF STEM AND KNEE
¾ OAK FRAME
KEEL, KEELSON, AND FRAME ASSEMBLY
KEELSON BEVELED TO FIT
¼ GALV. STOVE BOLT
KEEL
KEELSON AND KEEL ARE OF YELLOW PINE, SELECTED FOR STRAIGHT GRAIN
SHEER
CHINE
FRONT COCKPIT 38"
21"
KEEL
KEELSON
REAR COCKPIT 33½
17"
TRANSOM
¾ TRANSOM 4" FROM VERTICAL
W.L.
21½
24"
1
2
3
4
5
6
CROWN LINE
SHEER
CHINE
RABBET LINE
BASE-LINE
STEM
KEEL LAPS TRANSOM
LOCATIONS OF SEATS
17¾
GROOVE FOR GLASS
¾ OAK BRACKET
CUT OUT FOR COAMING
¾ WIDE ALUMINUM MOULDING
DETAIL OF RIGHT SIDE BRACKET FOR WINDSHIELD
1¼ OAK COAMING

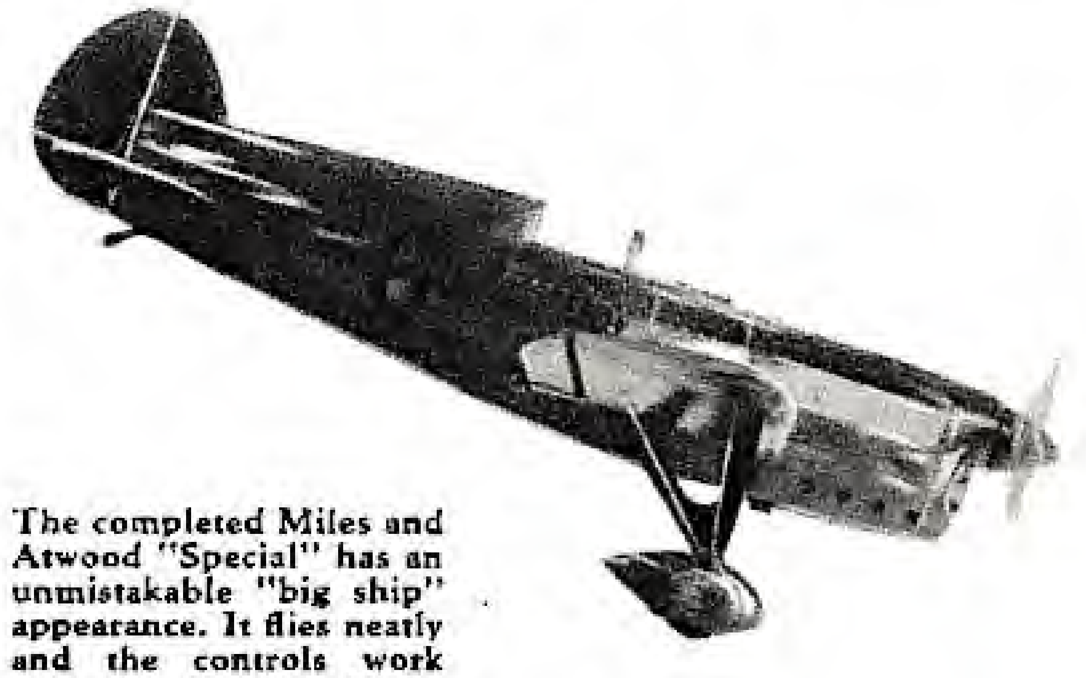
Above right—The stem must be made of oak. In the drawing above, the front of the stem is at the top rather than at left. The windshield bracket directly above will be reversed when built for the left side of the boat.


WATER LINE
11"
HALF-SECTION OF TRANSOM
8¾
5"
TRANSOM KNEE TO MOTOR PAD
¾ MOTOR PAD
¾ OAK GUSSETS
1½ OAK KNEE
KEEL
¾ X 2"

Above circle—All screws and bolts should be coated with marine glue to prevent rusting and loosening. At bottom left—Knee must be firm to withstand vibration of motor.

Building FLYING MODELS of FAMOUS RACING PLANES


Assembling the bulkheads to the tube or jig which forms the backbone of the completed model. This sensational form of construction assures a rigid backbone for the model.


The completed Miles and Atwood "Special" has an unmistakable "big ship" appearance. It flies neatly and the controls work automatically in flight.

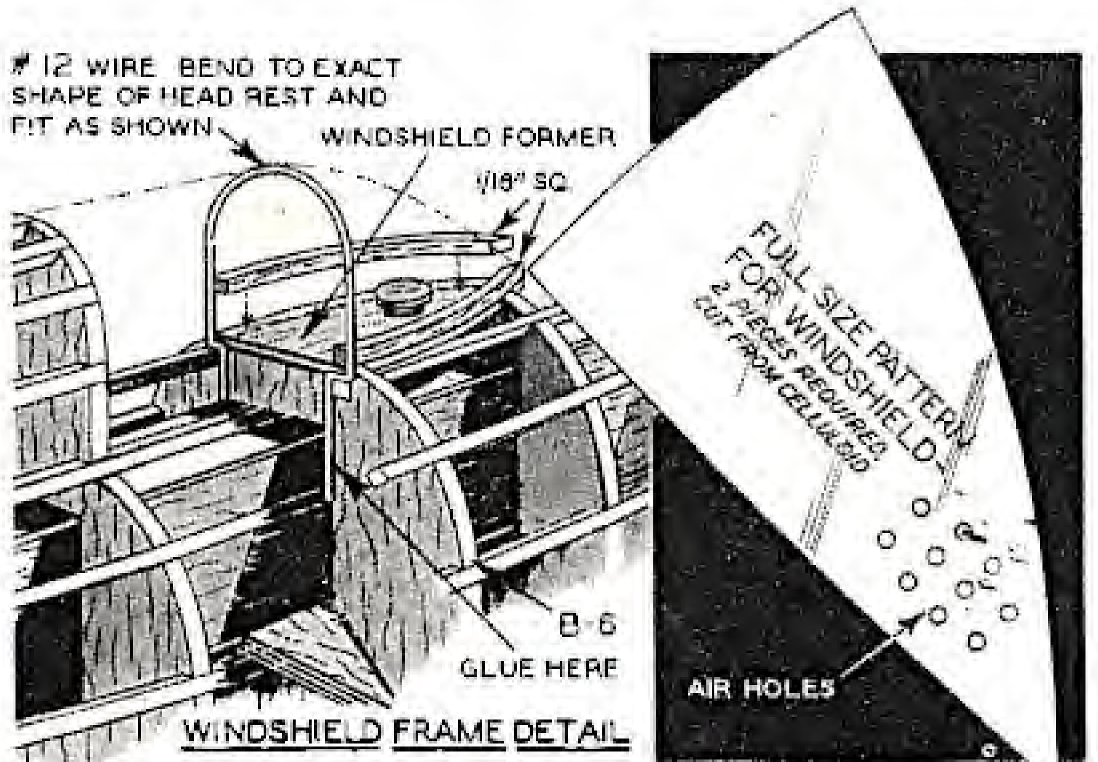
PART I

MODEL builders will be particularly intrigued by the unique features incorporated in the new MM—Lawrence W. Brown flying scale models, designed by Daniel E. Holloway. The Miles and Atwood "Special," holder of the 1935 American light plane speed record of 233.33 m. p. h., has been faithfully reproduced so that the completed model is a miniature duplicate of its famous prototype.

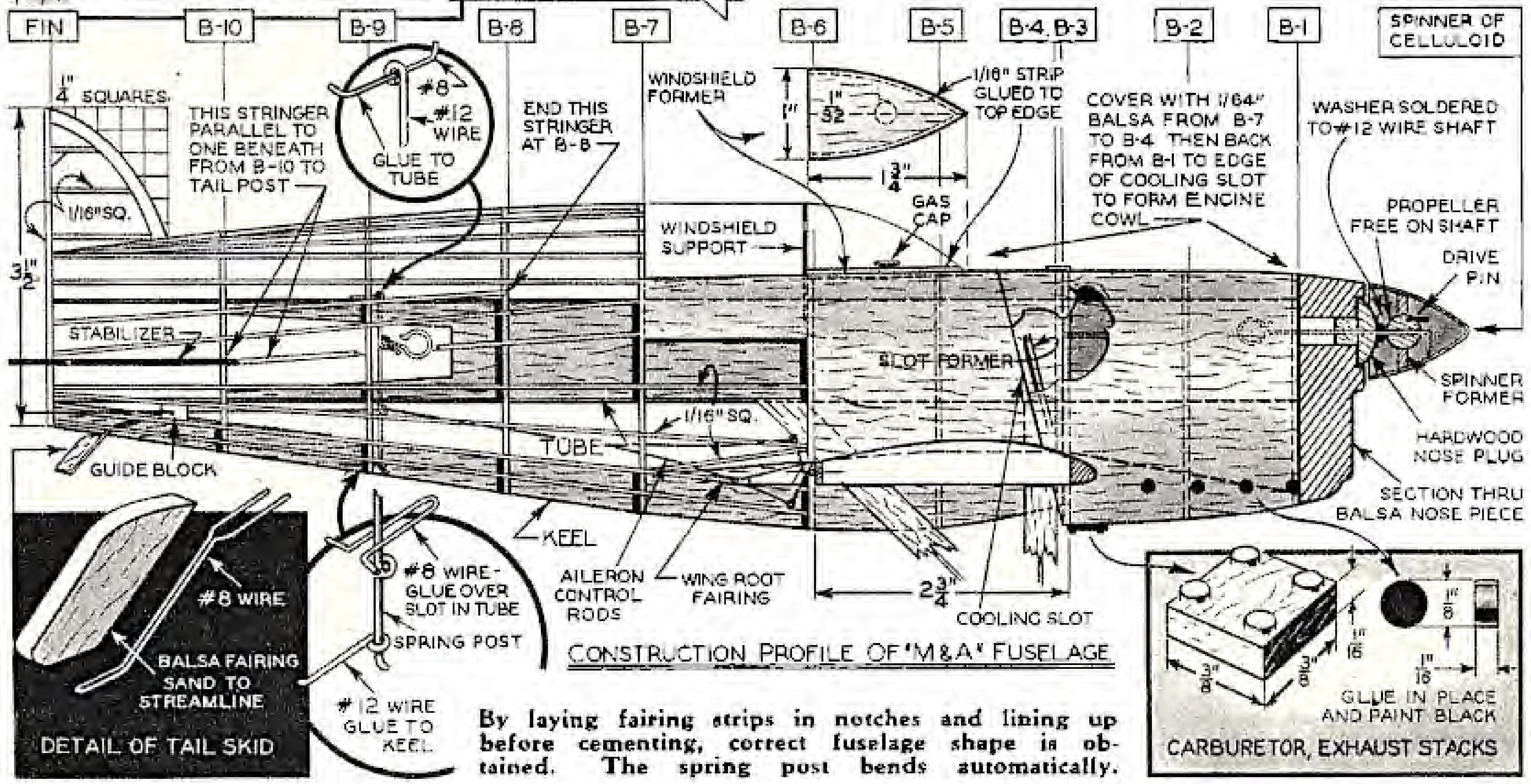
Like the "Miss Los Angeles," plans for which will be presented in a forthcoming issue, this model incorporates advanced features of construction and may be fitted with controls that really work in flight.

This control system is as simple as it is unique. Primarily designed to counteract propeller torque and produce steady flight, it can be set to produce banks, loops, and barrel rolls. Briefly described, the system employs the tension produced by the rubber motor when fully wound to actuate control rods connected to ailerons, rudder, elevators or wing flaps.

In practice the system is carried out as follows: The rear rubber hook is attached to a spring wire post which is pivoted at the top and free to slide through a guide or loop at the bottom. The tension of the rubber motor when wound springs the post forward and converts this movement through rods and cranks into positive action of the control surfaces it is connected to. Suppose we wish to overcome the effect of propeller torque, to take a concrete example. By hooking the control (ailerons and rudder) to the spring post and adjusting them so that as the motor is wound and the



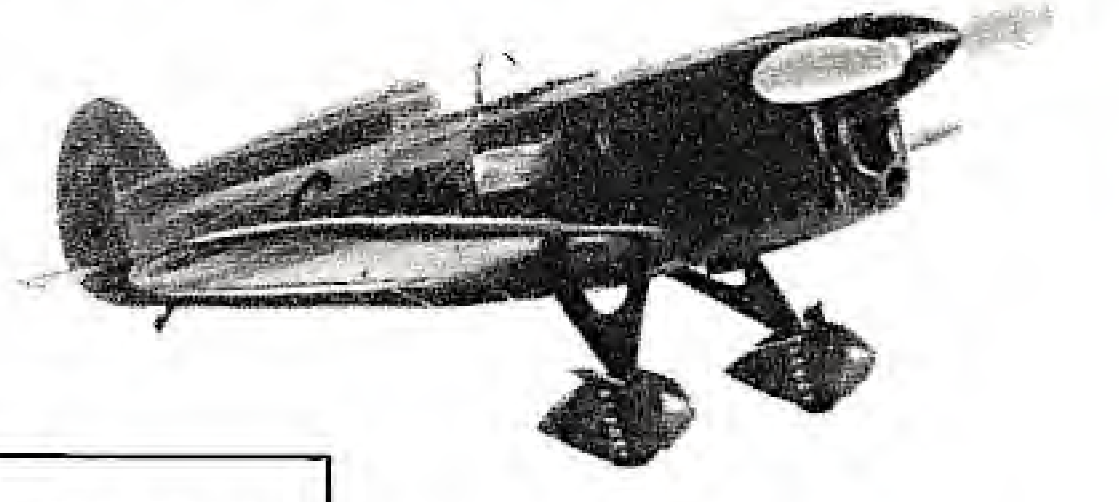
#12 WIRE BEND TO EXACT SHAPE OF HEAD REST AND FIT AS SHOWN
WINDSHIELD FORMER
1/16" SQ.
B-6
GLUE HERE
WINDSHIELD FRAME DETAIL
FULL SIZE PATTERN FOR WINDSHIELD
2 PIECES REQUIRED CUT FROM CELLULOID
AIR HOLES

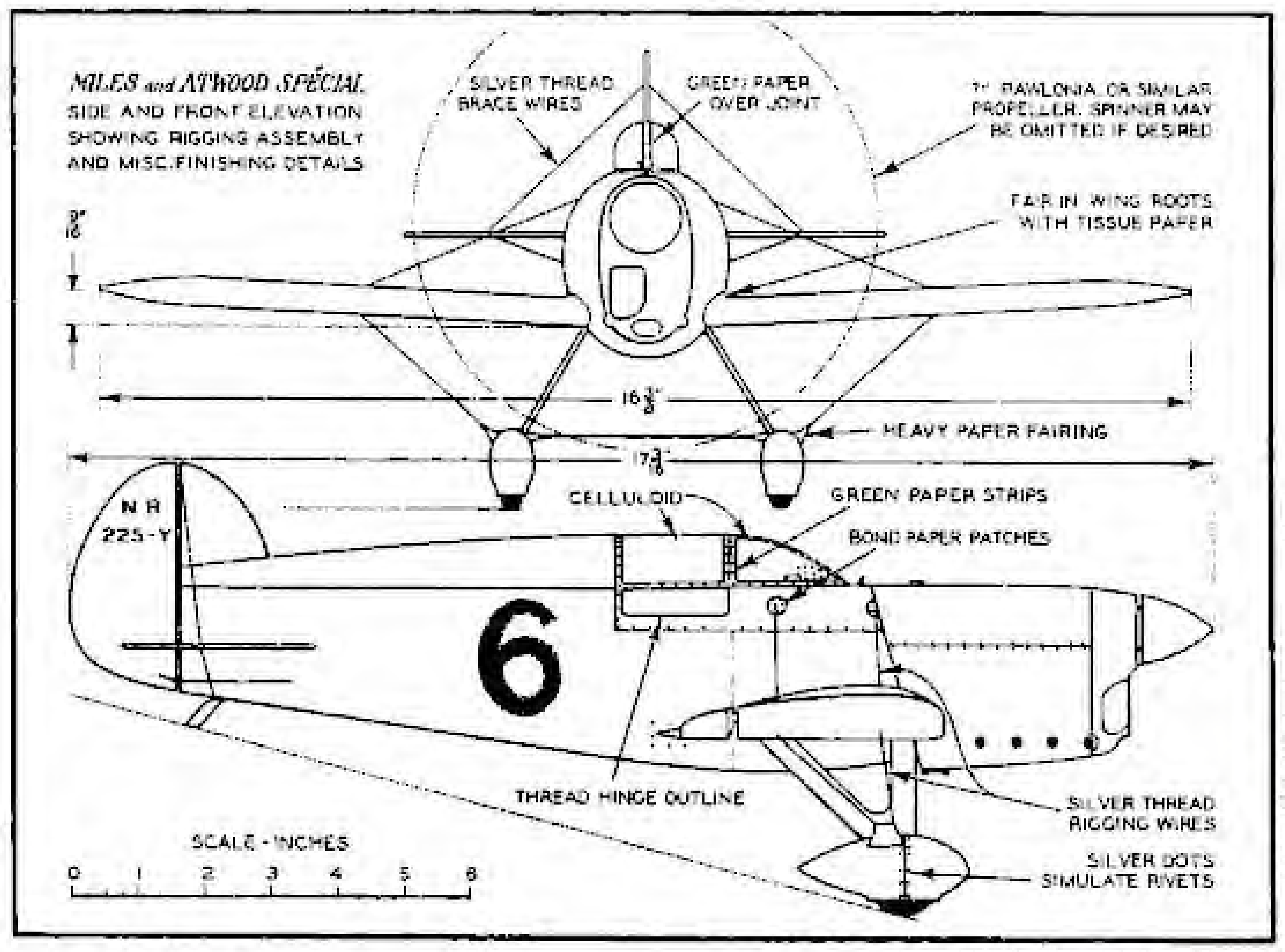


FIN
B-10
B-9
B-8
B-7
B-6
B-5
B-4, B-3
B-2
B-1
SPINNER OF CELLULOID
1/4" SQUARES
1/16" SQ.
3 1/2"
THIS STRINGER PARALLEL TO ONE BENEATH FROM B-10 TO TAIL POST
#8
#12 WIRE
GLUE TO TUBE
END THIS STRINGER AT B-8
WINDSHIELD FORMER
1"
1/32"
1 3/4"
1/16" STRIP GLUED TO TOP EDGE
GAS CAP
COVER WITH 1/64" BALSA FROM B-7 TO B-4 THEN BACK FROM B-1 TO EDGE OF COOLING SLOT TO FORM ENGINE COWL
WASHER SOLDERED TO #12 WIRE SHAFT
PROPELLER FREE ON SHAFT
DRIVE PIN
WINDSHIELD SUPPORT
STABILIZER
SLOT FORMER
1/16" SQ.
TUBE
SPINNER FORMER
HARDWOOD NOSE PLUG
SECTION THRU BALSA NOSE PIECE
GUIDE BLOCK
KEEL
#8 WIRE
BALSA FAIRING SAND TO STREAMLINE
DETAIL OF TAIL SKID
#8 WIRE-GLUE OVER SLOT IN TUBE
SPRING POST
#12 WIRE GLUE TO KEEL
AILERON CONTROL RODS
WING ROOT FAIRING
2 3/4"
COOLING SLOT
CONSTRUCTION PROFILE OF "M&A" FUSELAGE
3/8"
3/8"
1/16"
1/8"
1/16"
GLUE IN PLACE AND PAINT BLACK
CARBURETOR, EXHAUST STACKS

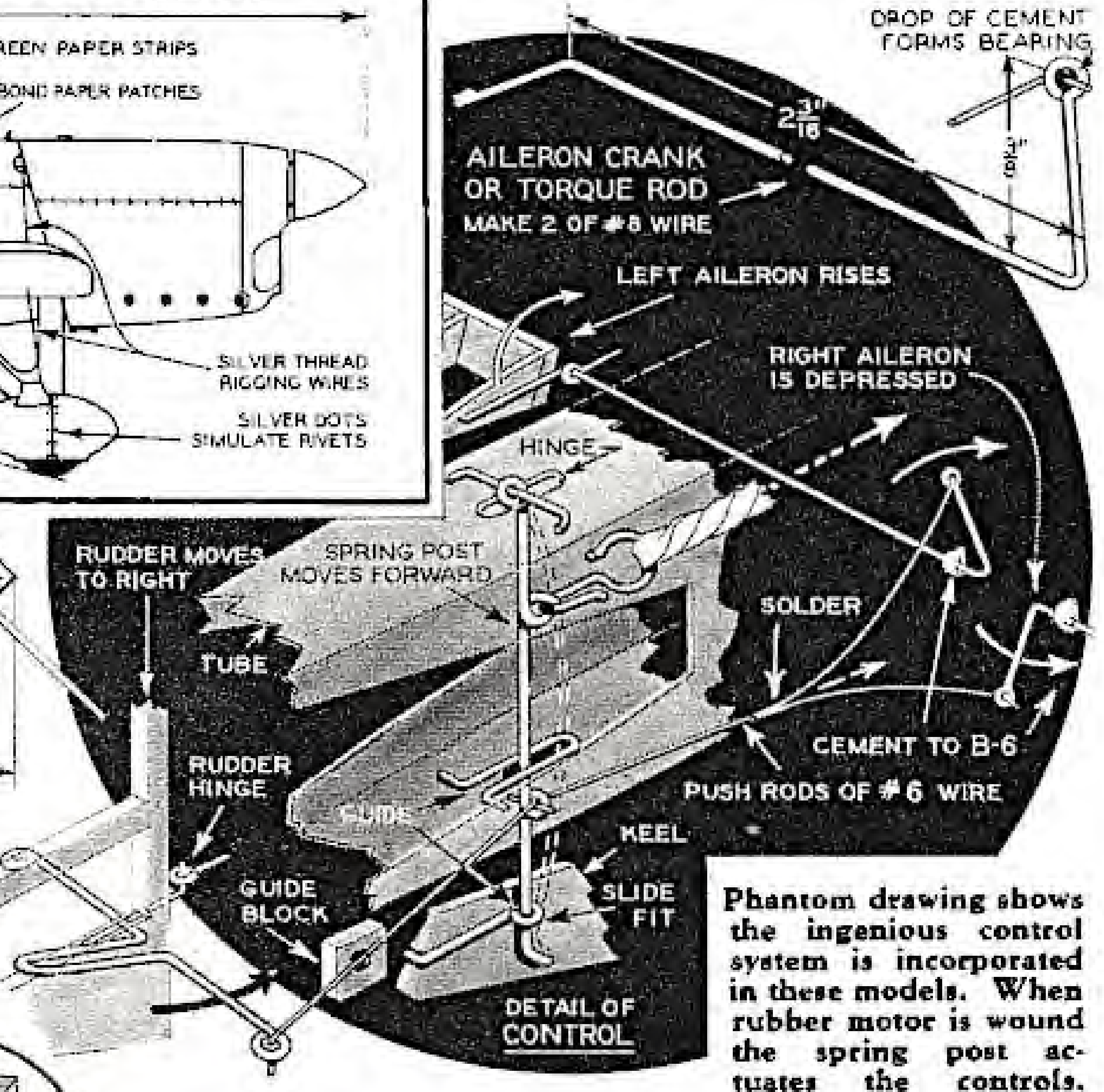
By laying fairing strips in notches and lining up before cementing, correct fuselage shape is obtained. The spring post bends automatically.

Embodying automatic controls and novel fuselage construction, the Miles and Atwood "Special" is the first of two accurately scaled miniature flying ships.


Another view of the completed Miles and Atwood "Special." The high gloss all-green finish with black numerals adds to the striking resemblance this tiny ship bears to its record breaking prototype. At left—Outlines of the plane with overall dimensions and miscellaneous finishing details shown.

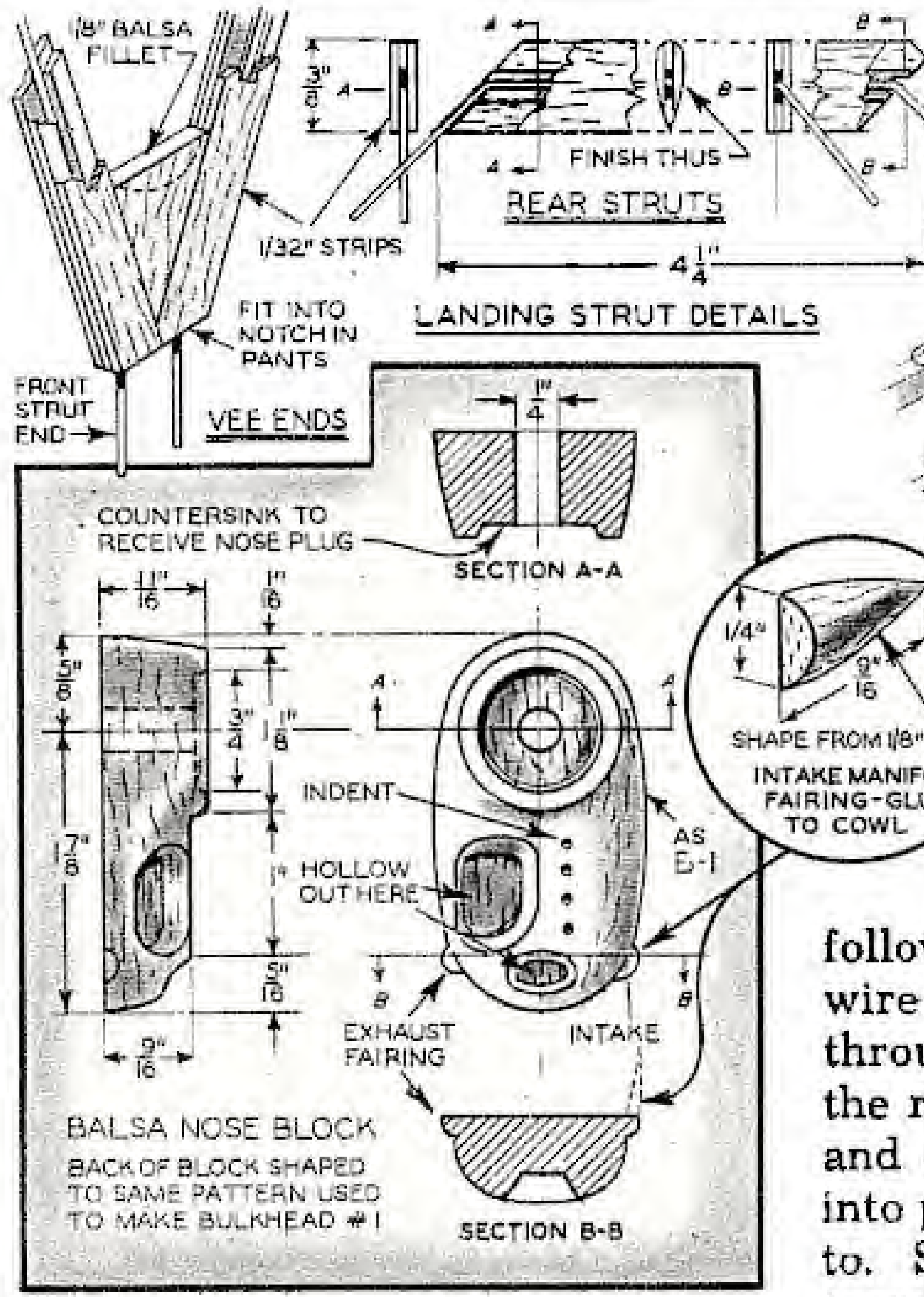


MILES and ATWOOD SPECIAL
SIDE AND FRONT ELEVATION SHOWING RIGGING ASSEMBLY AND MISC. FINISHING DETAILS
SILVER THREAD BRACE WIRES
GREEN PAPER OVER JOINT
7" PAWLONIA OR SIMILAR PROPELLER. SPINNER MAY BE OMITTED IF DESIRED
FAIR IN WING ROOTS WITH TISSUE PAPER
9/16"
16 3/8"
HEAVY PAPER FAIRING
17 3/16"
NR 225-Y
CELLULOID
GREEN PAPER STRIPS
BOND PAPER PATCHES
6
THREAD HINGE OUTLINE
SILVER THREAD RIGGING WIRES
SILVER DOTS SIMULATE RIVETS
SCALE - INCHES
0 1 2 3 4 5 6



DROP OF CEMENT FORMS BEARING
2 3/16"
AILERON CRANK OR TORQUE ROD
MAKE 2 OF #8 WIRE
LEFT AILERON RISES
RIGHT AILERON IS DEPRESSED
HINGE
RUDDER MOVES TO RIGHT
SPRING POST MOVES FORWARD
TUBE
SOLDER
RUDDER HINGE
GUIDE
CEMENT TO B-6
PUSH RODS OF #6 WIRE
KEEL
GUIDE BLOCK
SLIDE FIT
DETAIL OF CONTROL

Phantom drawing shows the ingenious control system is incorporated in these models. When rubber motor is wound the spring post actuates the controls.



1/8" BALSA FILLET
3/8"
A
B
FINISH THUS
REAR STRUTS
1/32" STRIPS
4 1/4"
FIT INTO NOTCH IN PANTS
LANDING STRUT DETAILS
FRONT STRUT END
VEE ENDS
1/4"
COUNTERSINK TO RECEIVE NOSE PLUG
SECTION A-A
11/16"
1/16"
5/8"
3/4"
1 1/8"
1 7/8"
INDENT
HOLLOW OUT HERE
AS B-1
5/16"
9/16"
EXHAUST FAIRING
INTAKE
1/4"
9/16"
SHAPE FROM 1/8" MAT.
INTAKE MANIFOLD FAIRING-GLUE TO COWL
BALSA NOSE BLOCK
BACK OF BLOCK SHAPED TO SAME PATTERN USED TO MAKE BULKHEAD #1
SECTION B-B

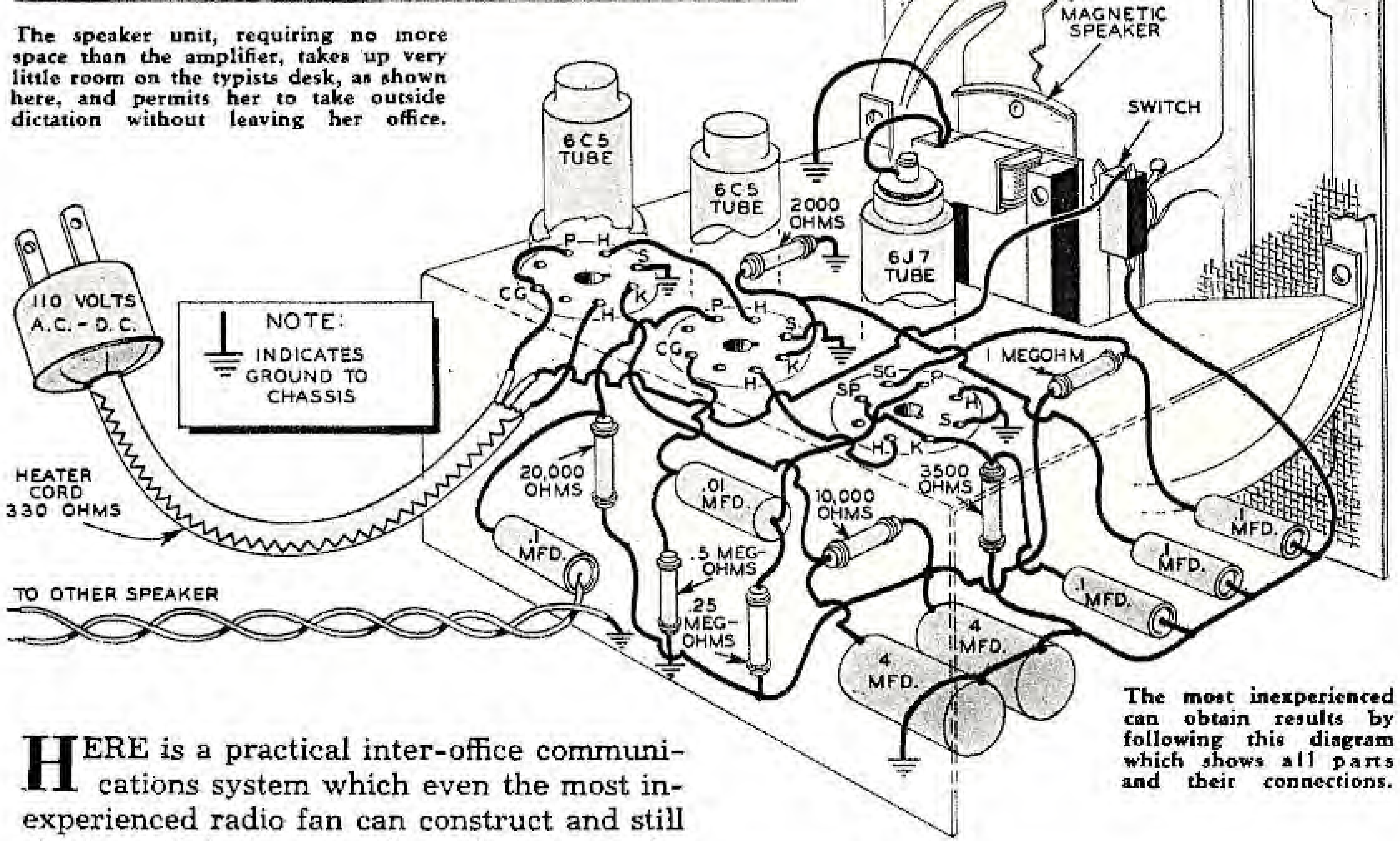
The nose piece is carved from soft balsa to simulate the Menasco C-4-S "Pirate" front cowling. Top drawing shows how landing struts are built up around wire.

A Midget Public Address System For Home or Office

by E. N. HARGRAVE

This tiny portable inter-office communications system permits distant conversation between rooms or offices. The device costs only a few dollars to make.

The speaker unit, requiring no more space than the amplifier, takes up very little room on the typists desk, as shown here, and permits her to take outside dictation without leaving her office.

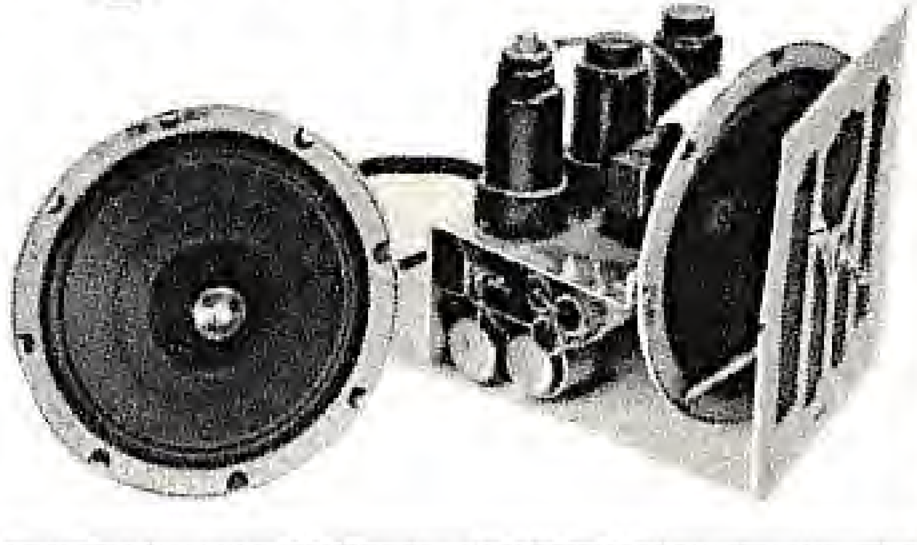

MAGNETIC SPEAKER
SWITCH
6C5 TUBE
6C5 TUBE
2000 OHMS
6J7 TUBE
110 VOLTS A.C.-D.C.
NOTE: INDICATES GROUND TO CHASSIS
P
H
S
K
CG
SG
SP
1 MEGOHM
HEATER CORD 330 OHMS
20,000 OHMS
.01 MFD.
10,000 OHMS
3500 OHMS
.1 MFD.
.5 MEG-OHMS
.25 MEG-OHMS
4 MFD.
TO OTHER SPEAKER

The most inexperienced can obtain results by following this diagram which shows all parts and their connections.

HERE is a practical inter-office communications system which even the most inexperienced radio fan can construct and still obtain satisfactory results. In wiring the device, which is extremely simple, it is only necessary to follow the pictorial diagram. The parts used in the construction can be purchased at a cost not exceeding $11 from any radio supply house.

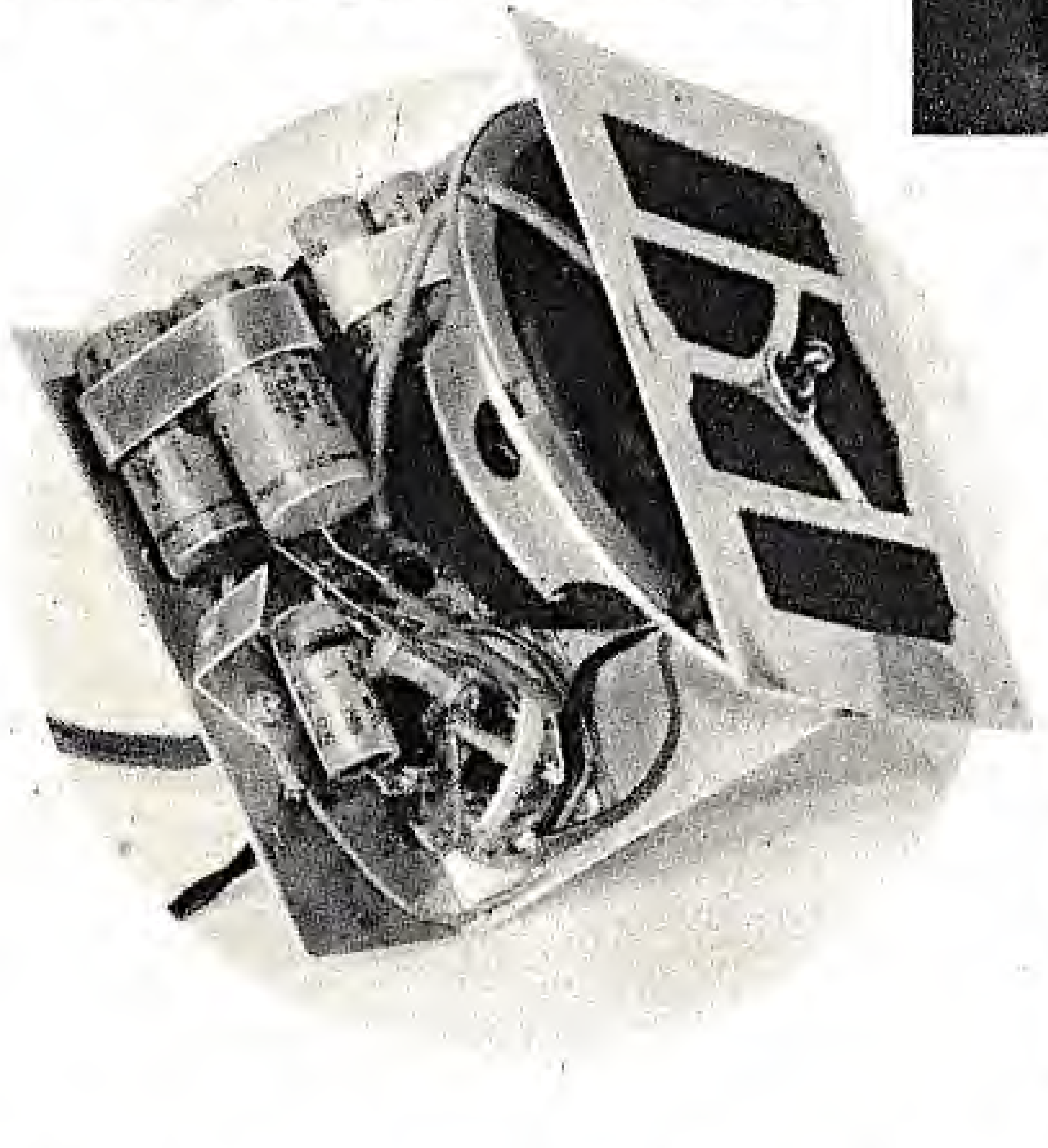
No microphones are required with this device since a speaker, operating on the reverse current principle, is employed. For this reason two speakers are used in the circuit; the one used on the amplifier acts as the microphone. The speaker at a distance serves in its normal capacity. Construct two cabinets from plywood so that when finished they measure about 5½ inches square by 4 inches deep. Mount a 5-inch magnetic speaker in one and the amplifier and microphone (actually the other 5-inch speaker) in the other.

The chassis is made of aluminum or any available metal bent to the shape shown in the pictorial diagram. A grill fashioned from aluminum serves as a decorative protection for the speaker and a support for the chassis. The set employs two stages of amplification supplied by a 6C5 and 6J7 metal tube. Another 6C5 is use in the rectified circuit. In wiring the set be sure that wires connect to the proper tube socket prongs since certain ones are not used. No power transformer is required since a line cord resistance drops the house current to required filament voltage.



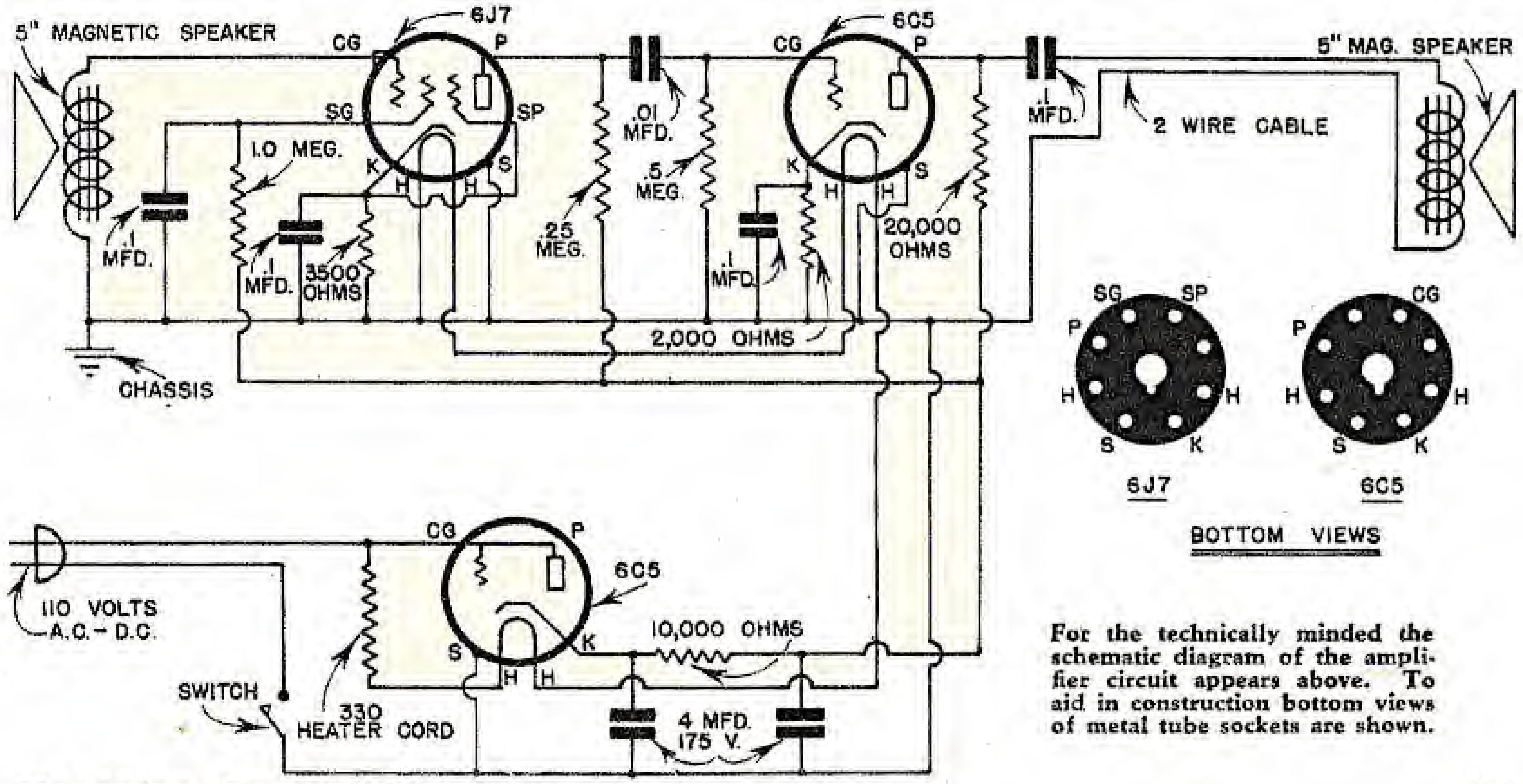
The speaker and amplifier as they appear before being inserted in the cabinets. The power switch is attached to the grill in the manner shown.

This is the amplifier as it appears when completed and in operation. Besides being useful in the office the unit makes a valuable device for conducting inter-room conversation.



All resistors are ¼ or ½ watt carbon types since they require little space. The tubular condensers are rated at 150 volts except for the two 4 mfd. units which are 200 volt electrolytic condensers. In order to eliminate as much wiring as possible the leads have been connected directly to the chassis wherever possible.

The amplifier and loudspeaker are connected by a length of lamp fixture wire. To place the system into operation turn on the switch and after the tubes have heated speak into the speaker attached to the amplifier. The system uses very little current.


5" MAGNETIC SPEAKER
6J7
CG
P
SG
SP
K
H
S
1.0 MEG.
.1 MFD.
.1 MFD.
3500 OHMS
.25 MEG.
.01 MFD.
.5 MEG.
6C5
.1 MFD.
20,000 OHMS
2,000 OHMS
.1 MFD.
2 WIRE CABLE
5" MAG. SPEAKER
CHASSIS
SG
SP
P
CG
H
S
K
6J7
6C5
BOTTOM VIEWS
110 VOLTS A.C.-D.C.
SWITCH
330 HEATER CORD
10,000 OHMS
4 MFD. 175 V.

For the technically minded the schematic diagram of the amplifier circuit appears above. To aid in construction bottom views of metal tube sockets are shown.

EX LIBRIS
Anonymous
Malefactor
MUSIQUE AND SWEET POETRIE AGREE
AS THEY MUST NEEDES
DATE
H. Ospovat 98